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POOR Mayor LaGuardia and his $50,000,000 North Beach airport are getting more bad aviation publicity than good. It started with that $5 minimum landing fee for private aircraft. Parking charges for visiting planes didn't help, either. But the latest wrinkle at LaChargia Field (as private pilots out east insist on calling it), is the best yet: 10c admission for spectators! You've got to admire New York's airport officials; it takes plenty of adroitness to charge the public $50,000,000 for a new airport, then charge the same people 10c a head to look at what they got for their $50,000,000. As we write this, no indignant citizen has challenged the legality of New York's sightseeing fee. But they say a private pilot already has tackled the landing fee in a novel way. As we heard it, this pilot landed to discharge a passenger. If the passenger was charged a dime for his visit we didn't know it, but we understand the pilot (a wealthy man) had given his passenger the $5 to give to the airport treasurer. But the operator in North Beach's control tower radioed the pilot that he couldn't take off without paying his fee personally. That rugged individual got mad and argued back. The radio operator insisted on his five dollar bill. The angry pilot took off anyway. Soon afterward, we hear, the pilot's lawyers were preparing to challenge North Beach's use of traffic control radio frequencies for purposes other than controlling traffic.

* * *

ONE of the finest books we've read on private flying for the average fellow is Wolfgang Langewiesche's "I'll Take the High Road". Mr. Langewiesche's determined efforts to set aside part of his weekly pay check for flying time, and the fun he had after saving enough for a cross-country trip in a *Cub*, vividly recalled many memories. His book makes you want to know him. Matter of fact, we tried. But our note, sent to the address in our files, came back. He'd moved. Hope he didn't save enough for a trip to Zanzibar. We'd like to have him write something for us.

* * *

CAME across some interesting figures on aircraft carriers the other night. They seem to explain why carriers have played such small roles in the current war(s). The Japs, we hear, crack up an airplane on approximately 66 out of every 100 landings or take-offs. The British: about 23 out of every 100. The U. S. Navy: less than one per hundred. The latter probably is why every foreign nation that has aircraft carriers keeps snooping around ours. Which, of course, is why American carriers are so guarded.

(*Continued on page* 91)

POPULAR AVIATION

Volume XXVI March, 1940 Number 3

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Cover Photograph: Piper "Cub" by E. H. Pickering

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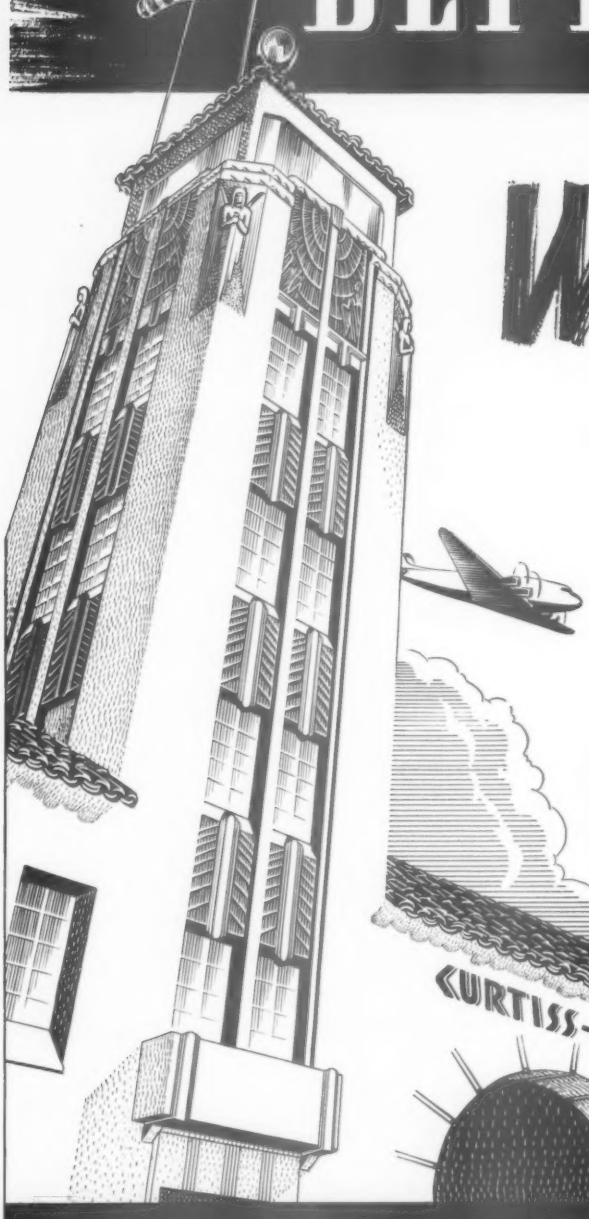

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"Tattered Wing-Tips," Editor, The Birdmen's Perch, Room 3800, Gulf Bldg., Pittsburgh, Pa.

STRAIGHT AND NARROW DEPT.

The other day we had a scare.

In the morning mail we got two letters. One look at the envelopes and we reached a trembling hand for our letter opener.

"Boy," we said to ourselves, "crime doesn't pay! Here's where that watermelon you swiped back in grammar school days catches up with you!"

We hacked 'em open.

The first was from Judge B. Rey Shauer of the Appellate Dept. of Los Angeles Superior Court, (P. No. 33424, by the way) containing a correct problem solution. Plus a sticker so hard we can't understand even the answer.

The other was from Officer R. J. Paquin of the Maine State Police hitting the same problem right on the noggin.

Gentlemen and scholars both! (Whew!)

"30 DAYS HATH SEPTEMBER . . ."

February—even in leap year—is a short month. So we're going to keep the commercial part of the Perch short, too.

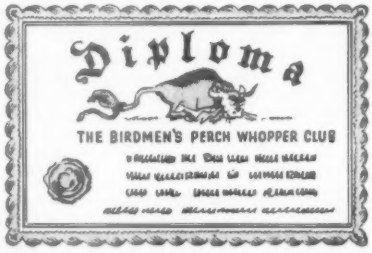
The reason you should use Gulfpride Oil is because it's the only oil refined both by conventional methods and by the famous Gulf-invented Alchlor Process. That's the refining magic that digs down extra deep into the 100% Pure Pennsylvania . . . *digs out up to 20% more sludge and carbon formers.*

That's short . . . but it means the sweetest-running motor you've ever known.

INCOME TAX PRACTICE PROBLEM

A pair of twin-brother mechanics we know, who spark on motors but misfire on practically everything else, came to us the other day.

On January first they'd asked their boss for raises which were granted. But they were given entirely different propositions.



When we saw them, they had tears in their eyes and circles under 'em from worrying over who would finish by making more money. So we offered to put the problem to our Puzzle Club, the majority of whom are *never* wrong!

Both now have salaries of, say, $2500 a year.

To Ronald the boss promised a yearly raise of $200 starting next January.

To Donald he promised a raise of $50 every six months starting, naturally, in July.

Who comes out on the long end in the long run?

(Be sure to send in *your* opinion, but *quick!* The boys are plenty worried.)

THIS MONTH'S WHOPPER

Dear T. W. T.:

Last week I was in the Kentucky mountain country and upon discovering that I needed some "Old Faithful" (G. A. G., of course), I landed my "Flitter Bug" in a clearing.

Getting out to reconnoiter, I saw two things, both of 'em full of corn. One was a large still and the other a considerably larger, rifle-bearing individual who called himself Luke.

"Luke," I sez, "can I buy some Gulf Aviation Gas in these parts?"

Luke proceeded to get a half nelson on a jug and drained it at a gulp.

"Well," sez he, "I reckon we uns had a jug of the stuff around here about two revenooers ago till we got it mixed with my corn. Zeke blowed the living daylights outen his jalopy and I got the gosh-awfulest feeling I ever had in my bread basket. I hain't had no use fer that suicide juice since."

That was where I got the idee to try using genuine Kentucky corn in the Flitter Bug. Having filled the main tank with corn, I took off on the few drops of G. A. G. in the reserve. Once in the air, I turned on the corn. Wham! . . . the old coffee mill sounded like a tornado in a junk yard! Three Whams . . . off blew three of the four cylinder heads!

I flipped on the relief tank but even G. A. G. couldn't make that single cylinder give more than 493 R.P.M. which gave me little hope of dying of old age.

With vibration rattling my teeth like castenets, I started to pray. The only opening in the forest in sight was about five miles ahead and four miles further than I had gliding altitude. I closed my eyes to concentrate on prayer. When I opened them again a few seconds later, there was the clearing right below!

Believe it or not, there was so much power in that G. A. G. firing in one cylinder, that it caused the wings to vibrate like a bird's.

So much like a bird's, in fact, that they easily propelled me twenty miles further to a real airport! —**Bill Lang**

P. S. In a purely scientific sampling after making the landing, I found the corn in the main tank much improved. Due, no doubt, to the vibration.

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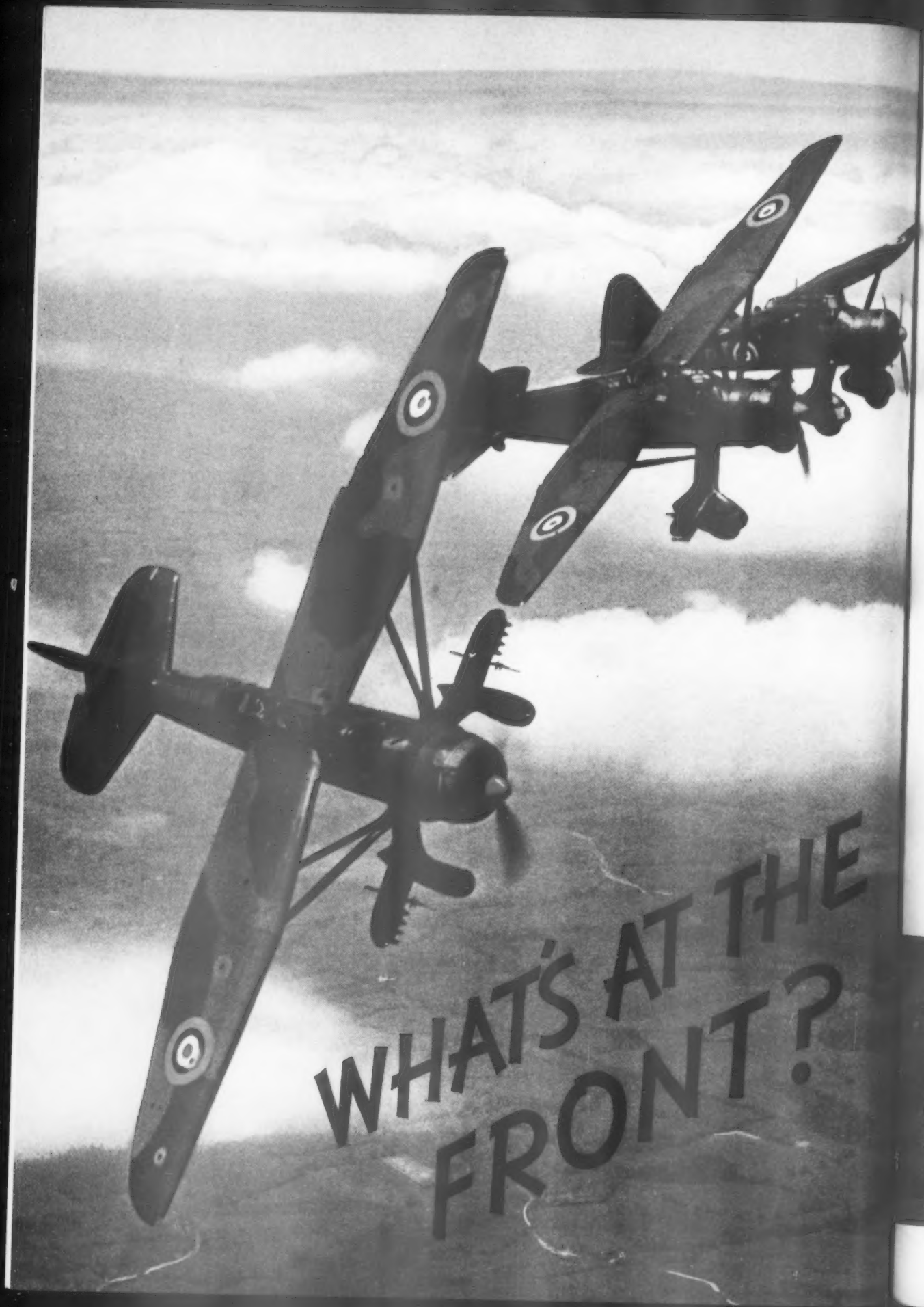

WHAT'S AT THE FRONT?

By LEONARD ENGEL

The skies over Europe are echoing with the engines of the modern warplane. The crucial test of actual warfare has revealed many startling facts about these ships.

WORLD WAR II's best bomber in large scale service is England's Bristol *Blenheim.* The most efficient single-seat fighter is the Supermarine *Spitfire,* also English. Unlike France, whose best service models all are represented right up at the front, Britain's special prides still are largely home-based.

England has the greatest variety; Germany, by standardization of a few basic types during the last three years, the least. The hottest article in the war—Germany's Messerschmitt Me-110 fighter, two engines, two 20 mm. (.8 inch) cannon, four machine guns and 375 m.p.h.—is, like the other outstanding Nazi plane, the Junkers Ju-88 bomber, almost entirely under wraps and has not even been seen more than once or twice.

All the planes, once the chips are down, are revealing wartime bugs that peacetime pencil-and-paper experts never counted on. Little things, but important—like rear-view mirrors in fighting cockpits. And Allied engineers and mechanics are getting lessons in ruggedness and reliability from their American ships.

This, in a few words, is how the planes in actual service—forgetting the experimental stuff anywhere from a month to a year from regular use—shape up today in World War II. There are more than 10,000 military craft in action or waiting along the front I have just visited, or at home bases. More thousands are on their way as booth sides take advantage of the winter lull to prepare for countering the big push each expects the other to make next spring.

Six single-seat fighter models are in regular use. Two, the *Spitfire* and the Hawker *Hurricane,* are English. One, the Morane-Saulnier "406", is French. France's Curtiss P-36 is American, of course. Two, the Messerschmitt Me-109 and Heinkel He-112, are German. Each of the German models has at least three different modifications though only one Me-109 (and that not the best) and no He-112s have been ordered to the front-line battle zone by the Nazi high command.

Fighter vs. fighter was the World War I way in which supremacy was settled. It is not quite so any more. Bomber chasing has become more important in the intervening 25 years and on that basis, the *Spitfire* takes the palm among the fighters. Vickers-Supermarine's years of Schneider Trophy racer building have gone into the little 5,500-pound *Spitfire's* design and help to account for its top speed of 362 m.p.h. at altitude. It thus shades the field, for the fastest version of its fastest rival—the He-112—hits no more than the 358 m.p.h. the Nazis claim for it. And the He-112, without any high lift devices fitted to it, lands too fast for pilots to like taking it up. The other half of the *Spitfire's* margin of superiority as a bomber chaser lies in its extremely heavy armament—the favored British arrangement of eight Browning .303 inch machine guns firing bullets in a converging stream. Four guns are in each wing. They fire outside the propeller disc.

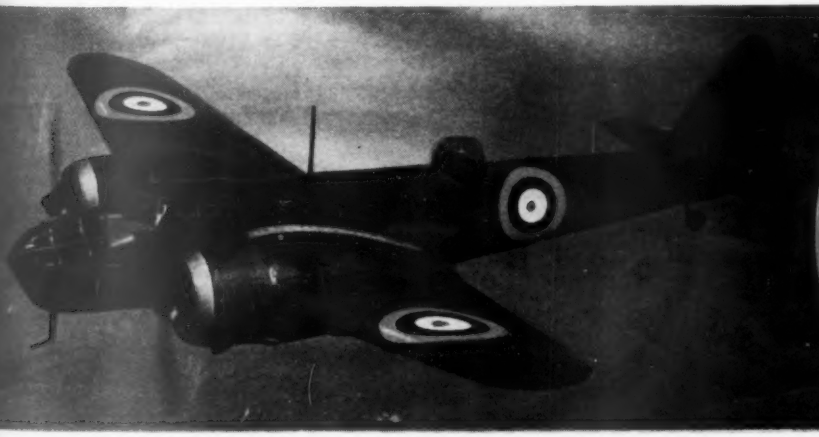
The *Spitfire* is powered with the Rolls-Royce *Merlin II* 12-cylinder in-line engine developing its maximum horsepower (1,050) at 16,250 feet instead of for take-off, as do most American power plants. It is the same *Merlin* which drives the slightly larger and slower *Hurricane,* as well as a dozen other British military planes. The *Spitfire* is small—span under 37 feet. Her single low wing is somewhat elliptical in shape. High lift devices keep her landing speed low—she lands and handles better, in fact, than the *Hurricane.* Both the *Hurricane* and *Spitfire* are astonishingly maneuverable; they can turn inside the American P-36, as shown in a mock combat between French and English pilots some of us were fortunate enough to witness. Like most of the other British planes one sees around, she would do better in take-off and initial climb if she were fitted (as in most cases she is not) with a constant speed propeller. But even so, the *Spitfire* can climb faster than any American pursuit planes in service. Except for control surfaces, she is all-metal; ailerons, elevators and rudder are fabric-covered. Most serious fault of the *Spitfire* and *Hurricane* both is that the sliding cockpit cowlings (which pilots do not like, by the way: if the cowl track is damaged, the pilot has a tough time getting out) runs flush and square into the fuselage right in back of the pilot's head. Rear view, in other words, is not so good—a matter of importance in this war game which seems to insist in great part of trying to get on the other fellow's tail. A rear-view mirror, standard equipment in German fighters, would help. (*Sentence here deleted by censor.*) The *Spitfires* are at home to guard against the bombers, their chief mission.

The *Hurricane,* too, is a low-wing monoplane. But instead of being all-metal, it is built largely of tubing and fabric. That makes for somewhat easier production—witness the hordes of *Hurricanes* that have cluttered Britain's sky for months. But there is one slight difficulty. You do not leave fabric jobs out in the open outside hangars as a rule—not in peacetime, at any rate. But in wartime, you leave nothing in hangars at all. Hangars are hard to camouflage and a bomb hit on a hngar wipes out more planes than a hit on an airdrome around which planes are scattered. The result is some slight difficulty with the fabric rotting. (*Sentence deleted by censor.*) It

(*Continued on page* 64)

The planes "peeling off" on the opposite page are British Westland "Lysander" army cooperation monoplanes.

Britain's Bristol "Blenheim" (below) is best large-scale bomber. Its loaded range, at 220 m.p.h., is 1,125 miles.



WAR IN THE AIR

With this factual report from the front, the following six pages contain the latest French, British, German, Russian and Finnish air-war photos

XUM

RUSSIA

Russia's specially-trained parachute troops, believed to be "invincible", proved useless in the Finnish invasion. Finn soldiers and flyers leisurely have machine-gunned whole regiments of these troops as they drifted slowly and helplessly down to the ground.

Russian copy of Boeing fighter is I-16. Its 700 h.p. engine gives it top speed of 248 m.p.h. Range is 500 miles. Armament: four guns.

This bomber, shot down by the Finns, is a ZKB-26. Note American propellers. Engines are an old French Gnome-Rhone design.

Standard biplane fighter is the I-5, a copy of obsolete British Bristol "Bulldog". I-5 has four guns. Top speed: 173 m.p.h. Range: 340 miles. Below is a late bomber type, probably a Wright Cyclone-powered SB.

The ARCTIC

Russia's huge, mysterious air force has made an amazingly bad showing against the insignificant number of airplanes in Finland's widely assorted, mostly obsolete, but grimly determined air force (see opposite page).

XUM

FINLAND

Already being shipped to Finns are 44 Navy-released Brewster F2A-1's. Engine is 850 h.p. Wright. F2A-1 has four guns, top speed of 300 m.p.h.

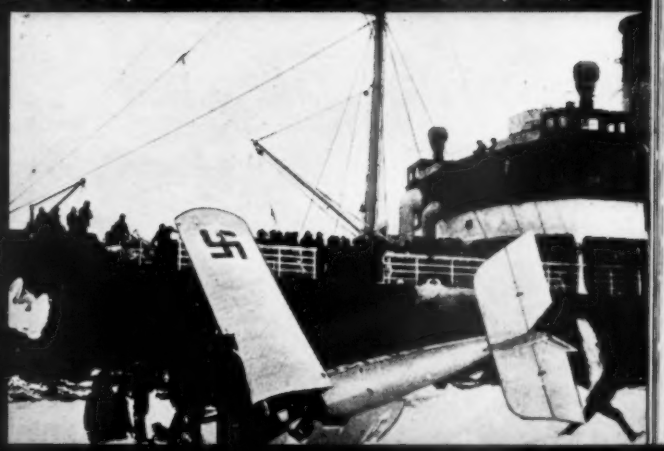
Latest Finn fighter now battling Russians is Dutch-built Fokker D-21. Top speed, with 760 h.p. engine, is 270 m.p.h. Range is 565 miles.

Old (1930) British Bristol "Bulldogs" also are being flown against the Russians. Engine is 450 h.p. Top speed: 174 m.p.h. Armament: two guns.

Dutch-built Fokker C-10's are another Finn warplane. Finnish model has air-cooled engine, top speed of 212 m.p.h., three machine guns.

Italy sent Finns several Savoia-Marchetti SM-79's (above) at war's outbreak. Below is ancient (1925) British Gloster "Gamecock" fighter still being used with success against Russians. Top speed is 155 m.p.h.

Finns already have some Bristol "Blenheims", will get more from British. "Blenheim" is 285 m.p.h. bomber, also being used against Germans by British. Below: a Finn trainer shot down by Russians.



XUM

The three German Heinkel He-111K's above were shot down by British and French fighters. The burning bomber (directly above) was shot into four pieces by a French Curtiss fighter. Latest He-111K (below) has transparent nose housing pilot and gunner. He-111K is widely used by Germans, has two 1,070 h.p. Daimler-Benz's.

Dornier Do-18 directly above was shot down off Brit coast. Originally an ocean mailplane (top photo), Do now is scout. Cruising range at 136 m.p.h. is 3,600 mi

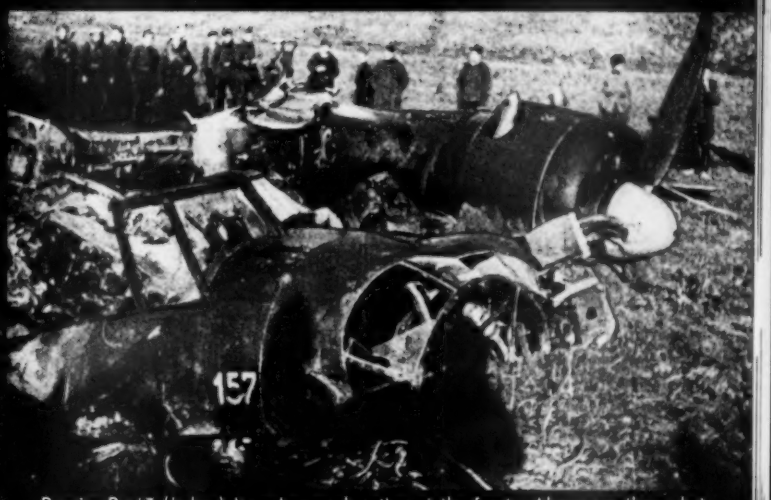
GERMANY

Most-feared air force i Europe today still belongs to t German Reich, despite the tr mendous proportions to which t Allies have built up their aer fleets. Yet, at this writing G man losses have been the highe

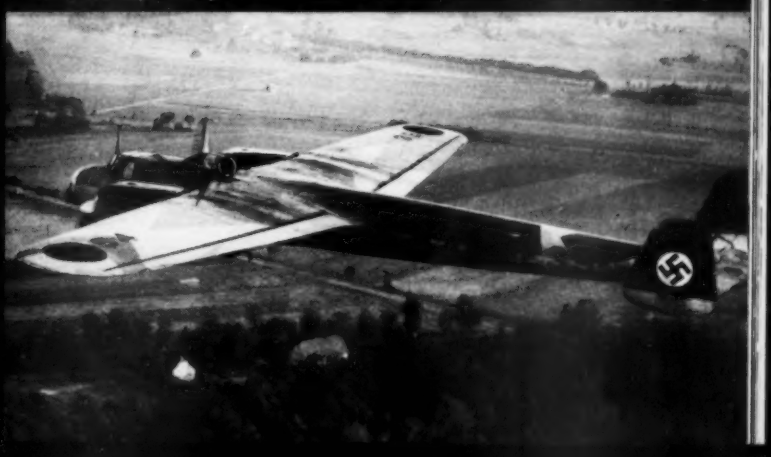
Heinkel He-115 is "cold meat", British flyers report. Clumsiness and blind spots have lost many. Speed is 190 m.p.h.

Blohm & Voss Ha-139 flew Atlantic mail, now is reported laying mines. Cruising range at 161 m.p.h. is 3,100 miles.

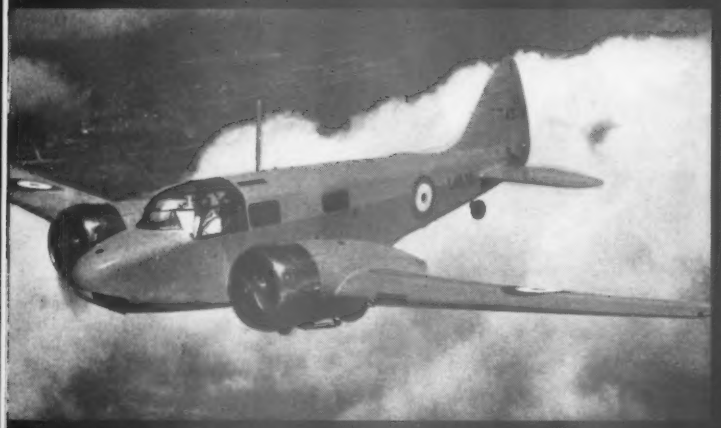
These belts of .303 caliber machine gun ammunition are about to be loaded into a Messerschmitt.



Dornier Do-17 (below) is seeing much action at the front. Above are three shot down by Allies. Note bullet holes in photo second from top; also feathered prop directly above. Do-17's use either radial or in-line engines. Top speed at 13,120 ft. is 292 m.p.h. Range is 1,490 miles. Armament consists of four machine guns.



CANADA



Majority of new British airmen are being trained in Canada. Types now in use in Canada include (above, top to bottom) Fairey "Battle", North American "Harvard" and Airspeed "Oxford". Below are these types at Canadian air base. "Battle" is 257 m.p.h. staple bomber at front. "Oxford" and American-built "Harvard" are trainers. Both Allies have bought hundreds of "Harvards".

FRANCE

Directly above is French squadron of Curtiss "Hawks" at front. "Hawk" has four guns, 1,100 h.p. engine, flies 320 m.p.h.

The ALLIES

Dozens of warplane types, many of them American, now make up the air forces of the Allies. With little hindrance from the Germans, British and French aircraft production has been stepped up to an estimated 1,300 first-line planes per month, excluding U.S. purchases.

XUM

ENGLAND

Top photo shows shot-up wing of British Armstrong-Whitworth "Whitley" after flight over Germany. "Whitley" (above) has top speed of 192 m.p.h., 1,500 miles range.

Loading for raid on German naval base are British Vickers "Wellington" heavy bombers. "Wellington" (top) is geodetic-type heavy bomber, uses two 1,290 h.p. engines. Range with load is 3,240 miles, top speed 257 m.p.h. Armament: five guns.

Avro "Ansons" (below) are widely used for submarine patrols. Engines are 310 h.p. each. Top speed is 188 m.p.h. "Anson" carries one gun and 10 light bombs.

Favorite British anti-aircraft defense is the multiple machine gun battery. Also in use are potent six-cannon "Chicago pianos".

Two-day stop en route to Miami was St. Petersburg, Fla. That city's excellent airport accommodated 406 cruise planes.

●

Three-year-old Ronnie Schantz flew the family Aeronca much of the way from his mother's lap. They are from Atlanta, Ga.

THE best and most frequently repeated story involved the girl pilot —Alma Heflin of Piper Aircraft— who had to take the wheel pants off her *Cub Coupe* to get out of the deep snow. The crew told the story in somewhat abbreviated form, usually relating merely that she lost certain wearing apparel in order to get away.

The largest amounts of propaganda were put out by those of us who "never made a single mistake, or got lost for even one second." And there are the rest of us—much more honest--who admit that we'd been lost, scared mildly or thoroughly as the case might be, and that we'd come on more by luck and good second guessing than by perfect piloting.

There were even those of us who cracked up our airplanes. Yes, we lost some airplanes. But we kept the record of the cruise intact in that we didn't hurt a single participant. There were lots of bruised egoes but no damaged epidermis. A pilot with a bruised ego is likely to live quite a while, so the results were healthy.

With this sort of prologue it must be apparent that "we" could be referring to no others than the pilots and navigators of the 1940 Lightplane Cruise to Florida. Some of us resented, more in fun than anger, the tags put on us by the newspapers. They called us the "Putt-putt Tour" or "Flivver Aircade." After all, what do we care what they called us? We're all glad we came along. We're all wiser, some of us sadder. But we've found again—for the fifth year in succession—that the lightplane pilots of the country are a grand crop of human beings. And we found that the new crop of pilots coming along right now are up to the general ability of the old timers.

Nevertheless—and without detracting from the record—we still think the theme song for our navigators should be entitled: "The Little Town That Wasn't There." It was suggested by Johnny Lerom and Murray Weible of Fargo, N. D., as especially appropriate for those who didn't use up all the free tickets for gasoline and lubricants furnished by the Gulf Oil company. As we all know, the only reason for not using up all the tickets was the fact that sometimes we got lost and missed one of the scheduled fields. When we got lost we had to buy our own gasoline. It's generally agreed that Joe Malecek of Fargo, N. D., was the winner of a freshly polished

XUM

679 TO MIAMI

By KURT RAND

Those lightplane cruises to Florida every January are getting bigger by the year. This year's set a record.

Above are two Piper "Cubs" en route with the Eastern Wing.

leather medal for missing stops. According to his co-pilot, Larry Blummer, they were able to get free fuel at only one town, having missed all the rest.

But statistics prove that the rest of us made up for Joe and his fellows. The great majority of us made *every* stop where we could get free gasoline. A recapitulation shows that we burned a total of about 110,000 gallons of 73 octane fuel in some 24,000 hours of flying. No actual count is available yet on either item but the estimates as made by "Doc" Kinkaid and other ubiquitous Gulf representatives are as follows:

By actual count there were 576 lightplanes—in the 30 to 75 h.p. classes at West Palm Beach airport on January 4. At the same time at two fields—Miami Municipal Airport and at Pan American Airport on 36th street in Miami—there were another 103 lightplanes. This puts the actual participants in the tour at 679 lightplanes—one enormous group of private airplanes which, by record, is the largest concentration of aircraft in the history of U. S. aviation.

These planes were estimated to have flown an average of 35 hours each—going and coming on the tour. Some exceeded this, others logged less, but that was the average. The Gulf agents believe that the airplanes averaged about 4.5 gallons of fuel each, per hour. When multiplied out this indicates that the planes flew 23,765 hours and burned 106,942.5 gallons. Including another 4,000 gallons for stragglers who weren't counted and for the fleet of nine Gulf Oil company planes—seven Stinson *Reliants*, the two-seater Grumman fighter flown by Al Williams, and the *Gulfhawk, Jr.*, a dolled-up Stinson "105"—this makes about 110,000 gallons of fuel burned.

We have no estimate of oil consumption and are unable to make one of our own. But we're told that at least $2,000 worth of oil was needed. Adding in all the costs, it seems that the tour this year cost Gulf some $15,000. That's a sizable contribution for this company to make to private aviation and we're hoping, as we believe every other pilot on the tour will hope, that it pays real returns.

Here's another side of the tour that was truly amazing—the actuarial record made by the pilots. Years ago (I think it was 1932) the Army Air Corps, under Maj.-Gen. Benjamin D. Fulois, now retired, conducted a great maneuver in which some 600 airplanes—all the planes in the Air Corps—took part. At that time the Army estimated that there would be at least six fatal accidents during the tour. That there were none was a testimonial to the pilots and to the mechanics who maintained the Army's planes and engines.

On this 1940 lightplane tour the pilots and passengers were amateur airmen. They were independent individuals not subject to Army discipline and supervision. They acted as their own mechanics, navigators, flight leaders and what have you. That not a single person was hurt is a real testimonial to the airmen and also to the modern light airplane—and to the modern light airplane engine, above all.

As for weather, well, we had the worst possible. The Central Wing of the cruise, coming from Lansing, Mich., Cincinnati, Detroit, Cleveland, Chicago and other middlewestern cities, ran into the worst snowstorm in 17 years at Louisville, Ky. We've already mentioned the tough time some of the pilots had at Hoosier airport, Indianapolis, where nine inches of snow, untouched by plough or roller, had to be negotiated.

The first day of the cruise we had ceilings on the route from Lansing, Mich.,

(*Continued on page* 94)

AVIATION

Tom Beck has his own ideas about aviation and puts them on record every chance he gets.

W. B. Courtney, Collier's official aviation editor, has been assigned to cover Germany.

By
SPENCER GREGG

BETWEEN PUBLISHING MAGAZINES AND BOOSTING THE CAUSE OF AVIATION, TOM BECK AND COLLIER'S ARE KEPT BUSTLING

TOM BECK—the head of the world's biggest magazine publishing house—is a large man and a direct one, and he will say right out that it wearies him to hear people talk about having adventures in airplanes. He has never had an adventure in an airplane, though he took his first flight in one of those box-kite affairs with the late Robert Collier back in 1912 and has been flying ever since. He thinks that perhaps it might be nice sometime to have one, so he could satisfy the morbid curiosity of those who ask him how exciting it is to fly from Chicago to New York, or from New York to Los Angeles, in an airliner. He is a kindly soul at heart and he does not feel quite up to making the disillusioning reply that he slept most of the way.

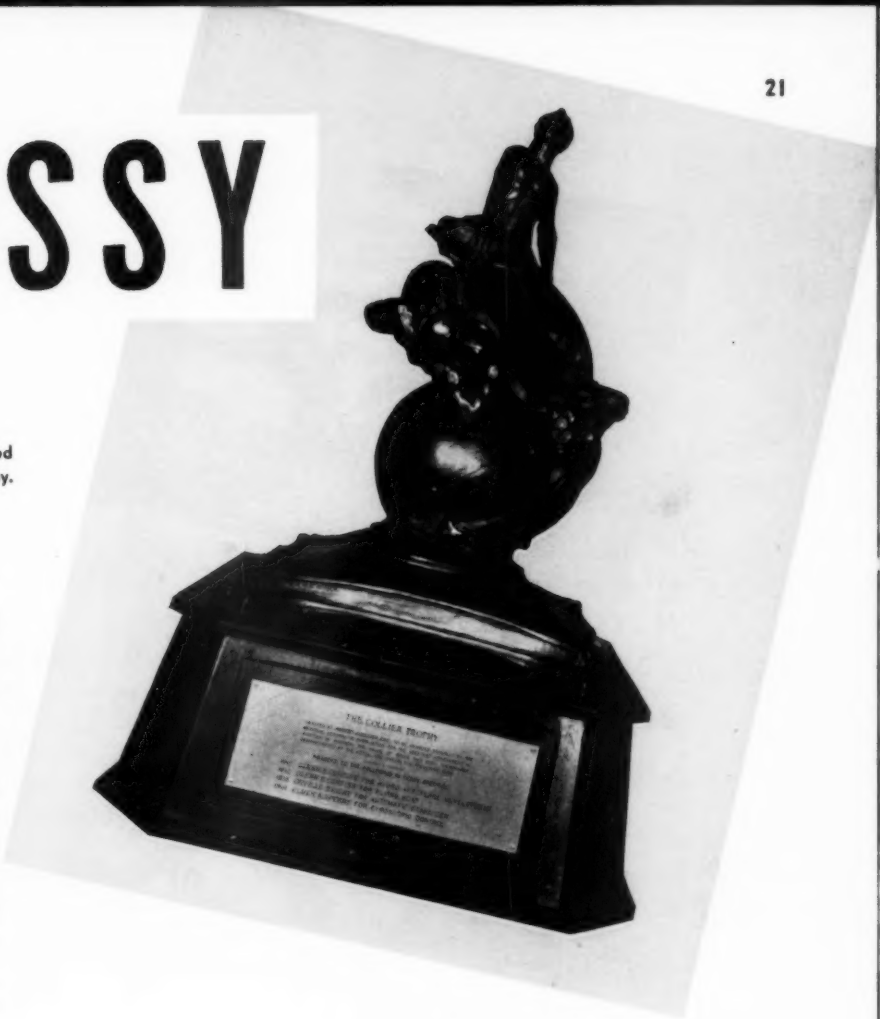
The fact is that he did, and does, which will provide some sort of an index to the air-mindedness of the man whose magazines print more articles about aviation than any other general circulation media in the United States.

Tom Beck is top-hand in the Crowell-Collier Publishing Company. Among its publications is Collier's, The National Weekly. Beck's interest in aviation, which the bilious-eyed would say borders on the extravagant, comes partly by spontaneity and partly by business inheritance. Robert J. Collier, son of the founder of Collier's Weekly, established the famous Collier Trophy in 1911, to be awarded each year "for the greatest achievement in aviation in America, the value of which has been thoroughly demonstrated by actual use during the preceding year."

Dating from the last punctuation mark, this piece will attempt to present Tom Beck's views on flying in general and on private flying in particular, as stenographically as the rapid pace of his conversation will permit. But any promise to keep it from ricocheting off into a profile of Tom Beck himself will be as subject to erasure as the platform of a candidate for public office after the votes are in. The man affects you that way.

XUM

EMBASSY



Probably the most famous and coveted award in aviation is the Collier Trophy.

Thomas Hambly Beck got sold down the river once by an eldery gentleman who had taken a fatherly interest in him. It was back in 1903, when people would line the sidewalks and yell "Get a horse!" to the benighted operators of horseless carriages stuck in the mud of Main Street.

"Beck," said the elderly gentleman, "automotive vehicles will never be anything but millionaires' toys, and you ought to stop selling the things and get into something with a future."

So he quit the horseless carriage business and began selling soap, which may be a sort of light irony, considering the gradual decline of the horse and the ingredients which soap factories put into soap.

Now, at 58, he is wised up on elderly gentlemen who try to give him advice and he is morally certain that nobody is going to sell him down the river on aviation. He has a prodigious faith in flying, embodied in his expressed belief that pretty soon lightplanes costing $650 will be offered to the public. If you press him a little, he will even shade that and say $600.

"It's just a matter of volume," he says. "The more airplanes that are built, the less they will cost. One of these days somebody is going to jump off the dock and build tens of thousands of light airplanes, just as Henry Ford did in the automobile business. Then and there prices will come down."

Tom Beck knows there are other problems to be solved, but they are subsidiary problems.

"What have we got in this country," he asks rhetorically, "some 2,200 airports? Only 600 of them have facilities for getting and transmitting weather reports. We need 16,000 airports in the United States. We need hangar space for untold thousands of airplanes. I don't mean big hangars. I mean ordinary ground stalls. Aviation needs prefabricated, individual hangars that can be thrown together and rented cheaply. Nobody ever built a hangar for a horse."

What aviation in the United States really needs, Beck will say when he gets fully wound up on the subject, is imagination plus advertising. And threaded through his conversation, which approaches a soliloquy when he talks about the magnificent cloud country he has seen aloft, is the fruit of that experience in the automobile industry.

"The younger generation is taking to flying," he says. "The older the mind, the harder the cement. But advertising is still needed for the mass market. A few months ago TWA detailed a transport to take aloft most of the school children of Albuquerque." Beck neglected to mention it was his idea. "Now TWA gets more traffic out of Albuquerque than it does out of San Francisco."

He remembers one brand of automobile—a by-word in the United States 30 years ago—which was not afforded the first prerequisite of good merchandising: advertising.

"Packard was its competitor," he recalls. "Packard advertised, and Packard is still going strong."

Advertising, he is convinced, will mean quicker mass acceptance of the airplane as a means of easy, comfortable transportation.

"The public is slow to accept new things. Bell invented the telephone back in 1876. Why, when I attended the Columbian exposition in 1893, it was still a novelty! What have we got today, 20,000,000 'phones?

"Then there was the radio. I remember when we had WJZ over in Newark, the General Electric station in Schenectady and KDKA at Pittsburgh. You listened on crystal sets with headphones. Somebody tried to sell us the exclusive rights to a radio station to advertise Collier's. People could hear about Collier's for miles around, he said. Nonsense, nobody was going to sell us a silly idea like that!"

He has his convictions about the character of the airplane advertising, too. "The public is afraid of speed because it measures speed in terms of what it knows—that of an automobile. Most of us have 40-mile-an-hour minds. Advertising should stress the ease and comfort and the luxury of flying. Don't scare people to death by harping on speed.

"It's all a state of mind. When 200,000 people go out to New York's new airport at North Beach on Sunday to watch the airliners arrive and depart, they must say to themselves, 'Well, it can't be very dangerous, or so many people wouldn't be traveling by air.' The fact that you can get a $5,000 insurance policy for 25 cents in traveling by air ought to be advertised more."

Beck sees a "tremendous" year in private flying in 1940. "The public is ripe for it. When a man flies his

Sky Flivvers

By Quentin Reynolds

Small planes are becoming a familiar sight in New Yorkers. The plane over Manhattan is an Aeronca.

Above is the sort of thing Collier's is in the habit of printing. In the absence of W. B. Courtney, Quentin Reynolds (below) was assigned to "Sky Flivvers". No aviation expert, his article was refreshing.

neighbor is going to fly. Man's imitative instinct will have a profound effect. Better and lower-priced planes will be manufactured. We will have greater comfort, more space, greater simplicity of operation. Then there are other considerations. We are realizing gradually that time is the only irreplaceable asset we have. You can lose ten dollars and earn another ten, but you can't call back an hour that you've lost. The automobile gave us speed. The airplane has given us more. Actually, there is a tremendous job to be done in this country to get everything else up to the pace of travel."

Tom Beck's concept of the future of flying finds a practical application in his own business. He is away from his office at 250 Park Avenue in New York fully a third of the time, and he flies everywhere. It saves time. He thinks nothing more of taking a plane than he does of picking up the telephone and calling London. And the only time he really got a thud out of telephoning London was the day he asked his representative there to sign up Queen Elizabeth for a series of articles. The connection was so good that Beck could hear the man across the pond hit the floor.

Beck's abortive association with the automobile business started in 1900, when there were only four horseless carriages in all of Detroit. He can still recall them: "A Ford, a Winton, a Locomobile and a fourth one made by the Olds Motor Works—which made launches." Those were in the days when motorists formed associations to promote good roads. Beck is convinced that similar organizations today, in aviation, should plug more resolutely for more airports.

Young Tom Beck had to take his prospects out for a demonstration, and he had the devil's own time of it because, as he puts it, "We didn't have any dual controls." Everybody thought of automobiles in terms of carriages. Even the tires were carriage or bicycle tires. "Get in one of those things!' Beck's friends would snort as he drove up wreathed in gasoline fumes. "Why, one burned up yesterday! Another one ran into a telegraph pole."

Those horseless carriages were so made, Beck reminisces, that when one of them got through draping itself around a telegraph pole, the driver thereof usually had departed this life.

One day in 1901 Beck started out with John Jacob Astor, the elder, to set a speed record between Washington and Baltimore. They would have, too, but the machine bogged down in mud at Laurel, Maryland. On another occasion he had more luck. He drove the 42 miles from Washington to Annapolis in 12 hours.

(*Continued on page* 86)

XUM

TRIM TRAINER

Latest Army Air Corps trainer is this graceful Ryan PT-20 powered with a 125 h.p. Menasco.

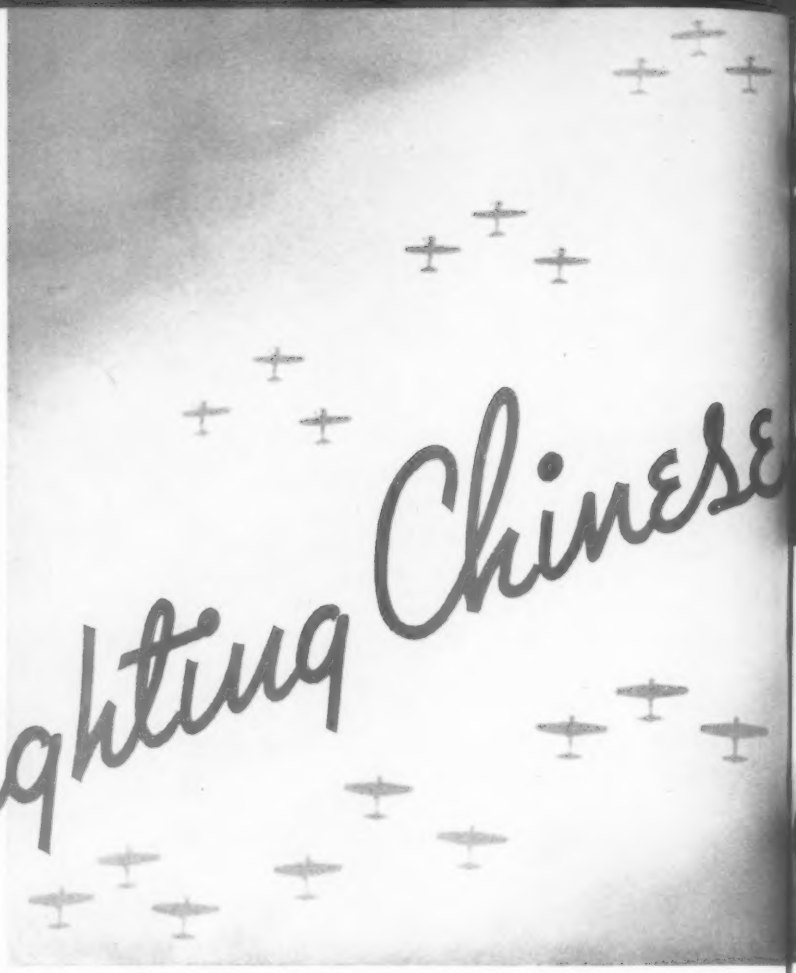
By

DEAN S. JENNINGS

*

China's tiny but potent air force battles the gigantic flying war machine of Japan.

The Fighting Chinese



Above are Chinese fighters and bombers, probably Curtiss "Hawks" and Northrop A-17's.

WHEN a squadron of trim Chinese pursuit planes roared across the night skies above Chungking some months ago and disintegrated a million dollars worth of Japanese bombers, military observers everywhere said knowingly:

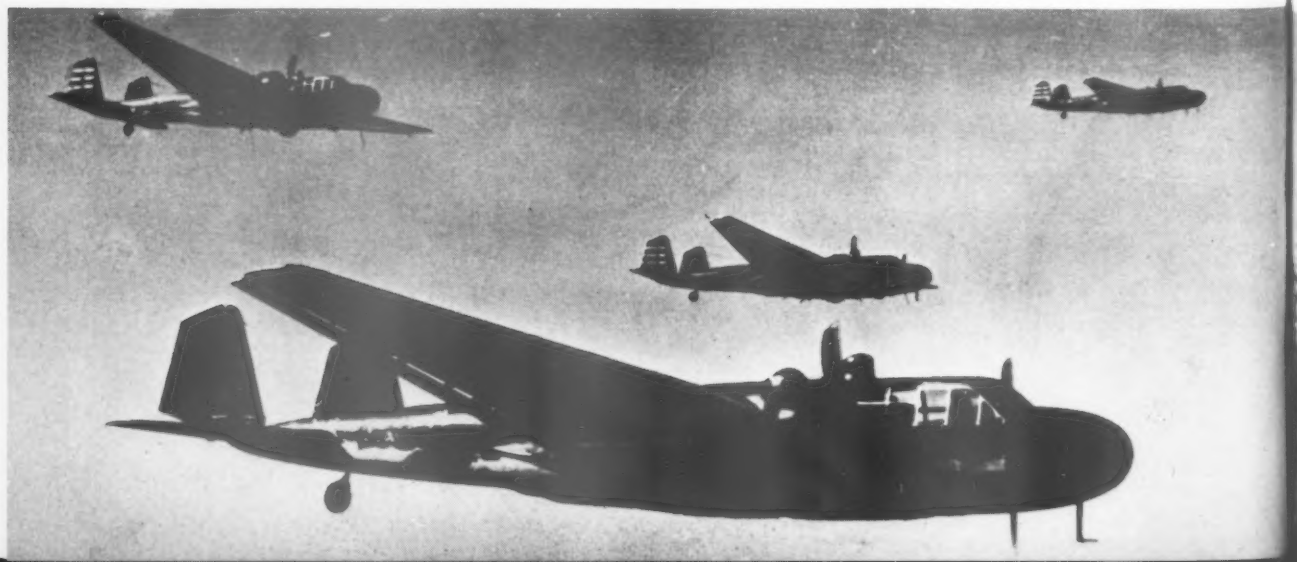
"Ah, the infant air force is growing up." Indeed, that's what has happened. The fledgling Chinese air corps, which two short years ago was like a barnyard chick trying to beat off a diving hawk, is losing its baby fuzz. It has dropped a few bright feathers in the moulting, has a few deep scars in its skin. But it has grown strong wings and a sharp beak—and the hawk has become cautious.

When the historians get around to writing about battle wings over China in the current Sino-Japanese conflict, they'll find much of the stuff that breathes life into the legends of heroes and nations.

Who are China's aces? What are their stories? What ships do they fly?

There are no press releases from Chungking to give the facts; no communiques or handouts in the glowing manner of clever Doktor Goebbels and his propaganda-conscious contemporaries. But wherever there are sons and friends of China in the United States,

Jap bombers below are Navy Type 96 (1936) patterned after a German Junkers design, probably the Ju-86K.



XUM

The majority of Chinese war pilots (left) learned to fly in American air schools.

Neutral observers say Chinese flyers (marching above) are superior to the Japanese in airmanship. Main fault with Chinese air force has been its poor leadership.

from the poorest workers in Chinatown laundries to the richest merchants, the latest news of the war birds is common knowledge.

It is known, for example, that 13 of the pursuits which shot down the Japanese bombers during the Chungking raids, were Curtiss P-36A's, purchased and shipped to China by Chinese patriots all over the world. Some of the planes were bought with the pesos, shillings, nickels and francs collected from poor but inspired Chinese citizens living in other countries. Others were acquired by lump contributions from wealthy men. Three of the ships, known as San Francisco 1, 2 and 3, were a prodigious gift from a super-zealot and chain store magnate, Joe Shoong of California.

Lieutenant Wang Tien-mien, who brought down two of the Mikado's bombers, said of the American ships: "It is a wonderful feeling flying ships that respond so beautifully they're almost human, particularly when you are used to old ships that would not maneuver."

The lieutenant said a mouthful. Because it wasn't so long ago that some of the Chinese pilots were doing their dog fighting in ancient Fleet trainers, old model Bellancas and other venerable crates that handled like a beer barrel truck on a muddy road.

It has been a rough path, all in all, for flyers in the Chinese republic. They went into the war with Japan in 1937 with obsolete equipment, raw and untried pilots, and a lack of trained personnel. They were blasted from their headquarters at Nanking, bombed out of Hankow and finally backed up against the nation's northern region at Chungking. But the fierce tenacity and courage of that amazing woman, Mme. Chiang Kai-shek—nominal chief of the air force—has molded and welded them into a hard-hitting, professional collection of fighters. The result, according to some experts, is that the Chinese in many ways have become better, smarter combat flyers than the Japanese.

Lacking originality and ingenuity, the Japanese fight strictly according to prearranged orders. They are impressive in formation, but according to the Chinese, the pilot who breaks away is usually headed for a one-way trip to his ancestors. Alone, the Japanese pilot seems to be Charlie McCarthy without Bergen and the records show that the percentage of dog fights won by the Chinese is incredibly lop-sided. I am told that the Chinese occasionally haul out their rich sense of humor and lead the enemy pursuits around in aimless circles until they run out of gas and are forced into dead stick landings behind the Chinese lines.

The Japanese, reliable informers say, also have a suicide psychosis. Ordered to bomb a certain obective, for in-

Still used by Chinese are these American-built Curtiss "Hawk IV" fighters (745 h.p. engine). Top speed is 248 m.p.h.

XUM

Japanese successes like the bombed Chinese factory above are due largely to the disorganization of the Chinese air force. Holes indicate various-sized bombs dropped.

Above is Shanghai's airport before being bombed by Japanese. Originally a commercial air base (note Douglases and dismantled Ford), it now is used by Japanese warplanes.

Irate Chinese promptly butchered all captured Japanese airmen until recently. Now captured Jap flyers (below) are well-treated on orders from Chinese government officials.

stance, they will go through with the flight even if the squadron leader sees in advance, not only failure of the raid but certain destruction for all his ships and men. Some Japanese pilots, missing targets, have been known to go into a power dive and deliberately smash their bomb-laden planes into the objective. It is a form of high-priced heroism avoided by the more practical Chinese in most situations. Pilots and ships are too valuable for sacrifice. In the great Hankow battle, the most spectacular aerial engagement of the war, the Japanese celebrated the Mikado's birthday and sent 38 pursuits and bombers to wipe out the Chinese. The Japs saw 12 of their ships destroyed; the Chinese lost only two.

It was the Hankow engagement that made Captain Lo Chu China's No. 1 ace. Students who attended the University of Southern California at Los Angeles a few years ago knew Lo Chu as a scholarly, soft-spoken lad who rarely mentioned his interest in aviation. But when classes were done for the day, when his American schoolmates were busy with football, movies, dances and other collegiate time-killers, Lo Chu was sweating over a motor at the Glendale airport. Before he left California to finish his studies in France, the young Chinese had become an able pilot. He picked up the fine trimmings at Paris, and got home just in time to test his wings in combat. He knocked off 11 Japanese planes in his first six months at the front, when dog fights were as rare as a Hitler truth.

Captain Lo personally opened the Hankow battle with a dive attack on a Jap bomber which had already dropped three eggs on the field. He sewed it up neatly with a thread of fiery slugs down its back, saw it burst earthward flaming, then zoomed to meet its two protective pursuits. The two Japs raked him with lead, saw his ship wobble and started up to finish him off. But Captain Lo had a faster climber; he picked up 2,000 feet on them before they could get him in their sights. Then, nose down, he gave her the gun and met them, spitting death from twin barrels. When the cleanup squad picked up the pieces on the field, they discovered that one of Captain Lo's two victims was Japan's noted ace, Lieutenant Takesutsi, who had shot down 17 Chinese planes up to the morning of that fateful day.

Another American-trained pilot, Wong Yu-kwun, accounted for two Japanese planes that day, but in the process his own ship got more holes than a cribbage board. He was shot through the arm and thigh, and remembered nothing more until he woke up in a Hankow hospital. They told him he had landed the crippled plane in a cow pasture —riddled wings, broken rudder, torn gas tank and all.

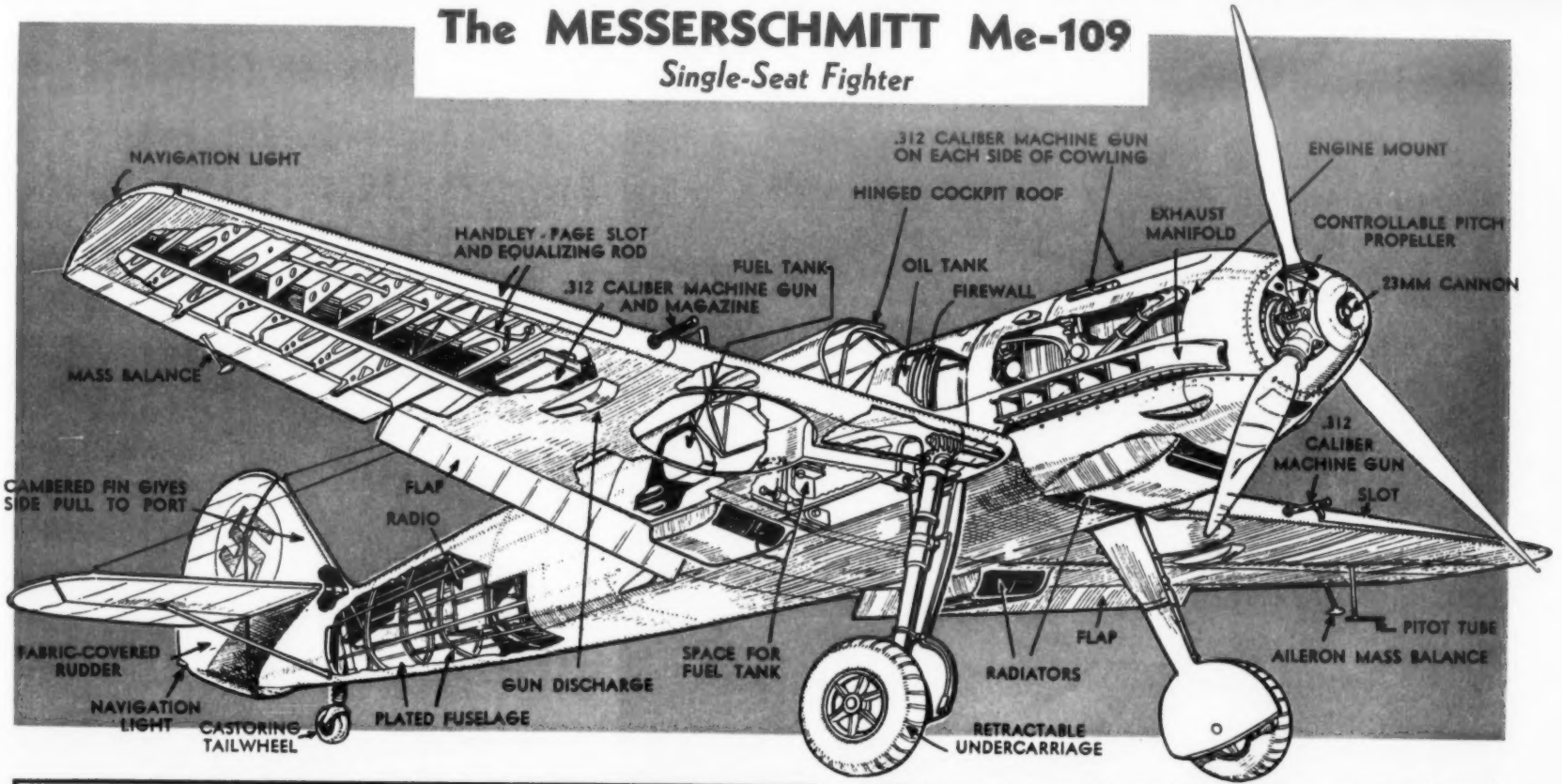
But not all of China's aces come back from the glory road. There is the story of Chen Chi-wei, whose star blazed brightly across the horizon of war,

(*Continued on page 74*)

XUM

The MESSERSCHMITT Me-109

Single-Seat Fighter



THE fighting plane on this page is to the current war what the deadly Fokker D-7 was to World War I. However, the Messerschmitt Me-109, for all its notoriety, has not achieved for the Germans the same degree of success scored by the Fokker. Yet, the Messerschmitt is a deadly foe that British and French airmen have reason to fear. The cutaway drawing above is reprinted through the courtesy of *The Aeroplane*, famed British aviation publication. It is the most detailed drawing of this much-discussed German fighter ever published. This drawing is of the latest version of the Me-109, powered with an 1,150 h.p. Daimler-Benz engine. A 23 mm. (.906 in.) cannon fires through the hub of the controllable-pitch propeller. Other armament consists of four machine guns. With the exception of fabric-covered control surfaces, the Me-109 is built entirely of metal. Wing span is 32 ft. 6 in., length 32 ft. The landing gear retracts outward. Handley Page slots and slotted flaps are standard. Empty weight is 4,180 lbs., loaded weight is 5,520 lbs. Full radio and oxygen equipment is included. Top speed at 12,300 ft. is 354 m.p.h. Cruising speed (62½ per cent power) is 298 m.p.h. Stalling speed: 75 m.p.h. Ceiling is 36,000 ft. Maximum range is 621 miles.

Remarkable BOAT

By HAROLD KEEN

★

THE world's most remarkable flying boat is an American product—the creation of an American concern's inventive genius, engineering skill and manufacturing efficiency. Snow and ice fields of the Arctic, the uncharted airways over the Indian Ocean, the peaks and plains of America, and the brooding majesty of a mountain-imprisoned lake 11,500 feet above the sea in an equatorial wilderness have known this rugged lord of the skies.

Little more than four years have elapsed since the Consolidated PBY-type seaplane emerged from the experimental stage and stood acceptable to the United States Navy. In that period, its utility as a scouting instrument has been so dramatically demonstrated that this country now can be said to possess a chain of outposts along a defense frontier 2,000 miles from its own shores or those of any of its possessions.

I. M. Laddon H. L. Mandolf

Outposts in the ocean? Yes, they're out there and none the less effective because they don't *seem* to exist. For, if the time comes that they must be occupied, whole fleets of PBY's will hover above the outermost line of defense to spot the enemy and will range the trackless thousands of square miles to the rear, back toward the visible bases on land.

These 13-ton craft won't have to be sent out merely to locate and then run for cover. With giant bombs or torpedoes secured to the 104-foot wing, they can deliver mighty deadly wallops. Well aware of the versatility, the reliable performance and the longevity of the PBY, the Navy has in operation more than 200 and before this is published will have ordered a substantial increase to this long-range sky armada. The PBY, after a thorough, extensive trial, has been adopted as the keystone of American aerial intelligence, to which is entrusted the obtaining of information on hostile Fleet movements long before enemy warships could be seen from American waterfronts. With U. S. naval strategy essentially that of engaging the enemy many miles from our territory, the role of the PBY has become a vital one, indeed.

Non-stop mass flights across great oceans and between far-distant bases have been made to appear so simple by the Navy's present-day patrol bombers that it is difficult to realize the first of such feats was accomplished only six years ago. In January, 1934, half a dozen P2Y's, sesquiplane predecessors of the PBY, commanded by Lieut.-Comm. Knefler McGinnis, took off from San Francisco harbor in an event of epochal importance. They were headed for Pearl Harbor, Hawaii—an unprecedented attempt which was authorized only after the Navy had probed completely the planes' long-range capabilities. Material failure could prove fatal. No stopping-off points existed between San Francisco and Hawaii. Faith in the P2Y's was rewarded and a new era in Naval aviation launched when the intrepid flyers landed at Pearl Harbor 24 hours, 56 minutes later, without mishap or untoward incident. The big flying boat had come of age. The P2Y now was in demand, not only here but abroad. They were sold to Colombia, Argentina and even one to Japan.

The prototype PBY was designated XP3Y. It is shown taking off for some initial tests.

When one airplane changes U. S. Navy's outlook on life, that's news. The ship is the PBY.

All the outstanding characteristics of this series were merged with unique new features in engineering of the PBY. An Austrian-born engineer, Henry Ikarus Mandolf—he is a graduate of the Austrian Naval Academy and now a loyal American citizen—conceived the important "disappearing pontoon" which helped increase the efficiency of the PBY's to such an extent they became comparable in load carrying and cruising speed to the much larger, four-engined transoceanic clippers. The pontoons were designed to retract outward and form the wing tip of the bomber in flight, thus reducing drag and improving the effective aspect ratio of the wing.

A further contribution to the PBY's great performance characteristics was the location of the fuel tanks, which were built integrally with the wing, allowing for large gasoline capacity at a minimum of additional structure weight which would be entailed by separate tanks. The entire hull, thus, is available for crew, passengers and cargo.

The Model 28—Consolidated's designation for the PBY—has exceeded 190 m.p.h. top speed, has a maximum range of 4,200 miles, a service ceiling of 29,200 feet, can climb to 15,000 feet in 13.4 minutes and requires less than a minute for full-load take-off. Russell Rogers, chief pilot of Richard Archbold's airboat "Guba"—a commercial version of the PBY—who is considered one of the world's greatest large airboat aviators, has been known to lift his craft off the water in 20 seconds.

Full cantilever tail and stressed skin monoplane wing were innovations in a seaplane of this size when introduced, with resounding success, by the PBY.

Approximately 225 of these high-performance craft, at about $150,000 each, have been delivered to the Navy. Since acceptance of the PBY in 1936, its achievements have amazed the world—not primarily because of the distance or duration of flights, but because of the never-failing dependability of the planes, the lack of incident that characterized each new lengthy journey and the ease with which vast areas of land, as well as water, were spanned. Forerunner of all these flights

Below is the Consolidated company's production line. Eight PBY's are shown.

XUM

PBY's have made names for themselves other than in the U. S. Navy. Reading from top to bottom above are: ship sold to Russia being loaded aboard freighter; PBY bought by British as forerunner of a large order; commercial version used by American Export Airlines for transatlantic survey flights; Richard Archbold's famous "Guba".

Latest version of the PBY is this tricycle-geared amphibian now being tested exhaustively by the Navy. Designated PBY-5, it is identical to original boat except for the landing gear.

was that which still holds the U. S. flying boat non-stop distance record—the jaunt in October, 1935, of the experimental PBY prototype, then known as the XP3Y-1, from the Canal Zone to San Francisco, approximately 3,500 miles. Hardly more evidence was needed to establish firmly the PBY-type as the long-range "eyes" of the Fleet.

The first transoceanic mass hop of PBY's occurred on January 28-29, 1937, when 12 bombers under command of taciturn Lieut.-Comm. William M. McDade negotiated the 2,553 miles from San Diego to Pearl Harbor in 21 hours, 48 minutes. In this and the many succeeding long-distance jumps, the Navy stressed the routine nature of the assignment, which was merely to deliver new equipment to another base. The admirals, characteristically unconscious of the dramatic appeal of such spectacular ventures, never could understand why movie cameramen and reporters cluttered up the ramps on the days these giant mechanical birds took off.

Repetition has robbed the process of its adventuresome flavor, but by the same token has illustrated the efficiency peak of Uncle Sam's equipment and aviators. Still another, perhaps more significant, fact has been illustrated by the many PBY mass flights from San Diego to Hawaii, the Canal Zone, the Pacific Northwest and Alaska. The transfer of scores of airboats by this method—48 were sent in one maneuver from their San Diego base to the Canal Zone in the 1939 Fleet war games—has shown that all vital links of American defense can be equipped, in 24 hours or less, with the telescopic vision required for successful naval action.

The PBY's, having only recently replaced the Navy's fastest destroyers as the first scouting line, can be shifted from one base to another, as needed, and in large groups, at short notice and in little elapsed time after take-off. That's tremendously important to a nation with far-flung frontiers, with valuable areas far to the north (Alaska and the Aleutian Islands), far to the south (the Canal Zone), far to the west (Hawaii and the Philippines), and a long distance to the east (Puerto Rico, Cuba and the Virgin Islands) from the major airboat concentrations. Only within the past few months has this high mobility been employed under conditions of national emergency. With the United States extending its patrol areas as result of the European war, a squadron of 14 PBY bombers, normally based in Pearl Harbor, were secretly ordered to the Philippines. No United States warplane had ever flown across the international date line, west bound, prior to that time (September, 1939). The unit, commanded by Lieut.-Comm. Sam LaHache, clicked off the miles in precise fashion, utilizing the Pacific stepping stones at Wake Island, Midway Island and Guam—following a route blazed by a commercial enterprise, Pan American Airways.

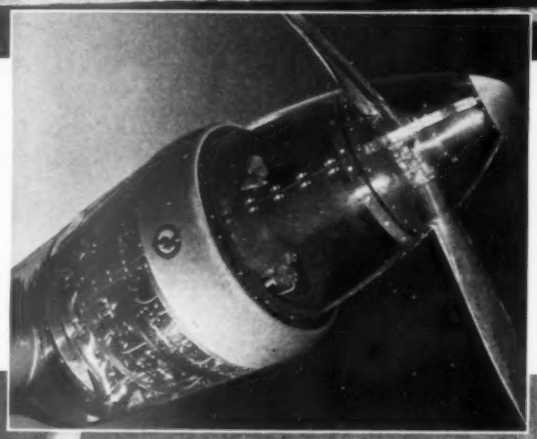
Should an enemy fleet threatening Hawaii require immediate stationing there of large numbers of patrol bombers, they could be flown from San Diego today in far less than 20 hours. Only 16 hours, 3[illegible]

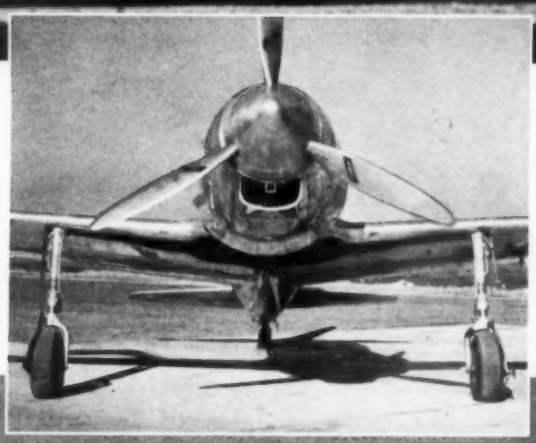
(*Continued on page* 80)

XUM

VANGUARD

ARMY AIR CORPS engineers at Wright Field should be learning things about the new Vultee fighter shown on this page at about the time this appears in print. First named *Skycat,* then renamed *Vanguard,* the new fighter is powered with a late extended-shaft *Wasp* of about 1,100 h.p. Ultimately it will use the 1,600 h.p. model shown in the inset. Top speed is about 400. Maximum armament is ten machine guns and 10 small bombs. Basic design resembles Howard Hughes' record-holding transcontinental racer. Note wide landing gear.

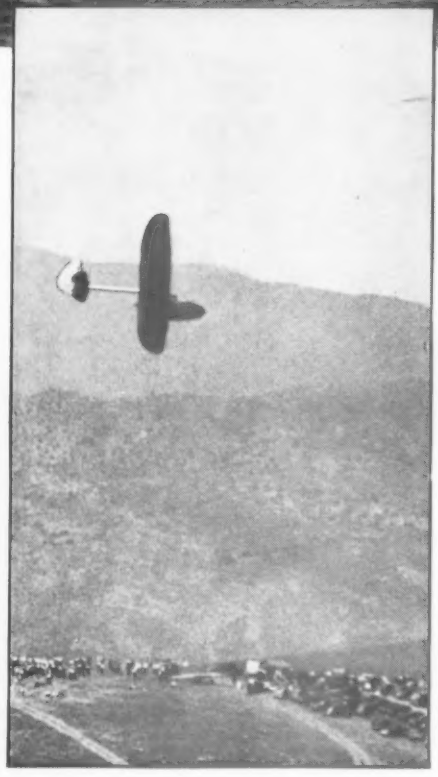




XUM

Pioneer gliding organization on the Pacific Coast is the Southern California Soaring Association, a lusty group of happy zealots.

The sport-flying of sailplanes like that above is rapidly becoming a leading sport. The increase in the number of new gliding clubs during the past year has been high.



"Speed" Westphal

FOUR gliders rest on the flat, sandy wastes of Rosamond dry lake two and a half hours of driving north and east of Los Angeles. As the early Sunday morning sun slants onto the lake bed, four crews of four or five men each—and there may be a woman or two along—prepare for a day of soaring.

First one glider gets away swiftly, accelerating along the flat at the end of a more-than-a-thousand foot wire attached to its tow car. The car is an ordinary automobile which more likely than not has towed the glider in a trailer to the lake bed. A gliding enthusiast is at the wheel, probably thinking that before long it will be his turn to go aloft.

The glider rises like a kite at the end of its string, up 100, 200, 500 feet—and the pilot cuts loose. As the ship settles in lazy, eccentric circles, the pilot seeking thermals, the day of sport has begun. From this time until late afternoon, barring unforeseen difficulties, members of the Southern California Soaring Association will be getting in their time. It may be a dead day in winter, with few uplifting currents worthy of the name. It may be a day in spring, summer or fall, when some of the flights will last an hour or more.

But, whatever happens, the crews will have a swell time. I specify Rosamond because it is the most popular at this moment. Actually, you may find one or more crews of the 125-member Southern California Soaring Association trying for thermals there, at the Palos Verdes hills, near Redondo; at Vail Field, a few miles east of Los Angeles; at Shandin Hills, near San Bernardino; or at the Arvin-Sierra Soaring Port, headquarters for the annual meet, a few miles east of Bakersfield.

But, wherever you go, you'll find ac-

This is a typical crowd gathered to watch a S.C.S.A. meet on Rosamond dry lake.

SILENT FLYERS

by

EDWARD CHURCHILL

tivity—action which has been growing by leaps and bounds during the last four years, starting with the first real meet at the north end of the Los Angeles Municipal Airport four years ago. The outfit boasts of about 15 or 20 community- and individually-owned gliders, depending on who hooked what wing against what boulder or brush last weekend. The association owns no planes, boasts of $1 per year dues and is made up of crews, groups of men and women who have bought or built ships and have been banded together by common interests.

Four years ago the outfit, founded in the boom years of 1928-1929, was moribund. There wasn't enough gliding in southern California to clutter up one weak thermal. Then, under Dr. Wolfgang Klemperer, research engineer with Douglas Aircraft, first regularly licensed glider pilot in the world; F. W. ("Speed") Westphal, who flies, writes and promotes; Harvey Stephens, famed motion picture actor, and numerous others, the art of soaring came back.

Today, with its 125 members, the association has a record of three eminently successful annual April meets at Arvin, Cal., the last one a financial success and participation in the nationals at Elmira, N. Y., as well as a winner in the southern meet at Wichita Falls, Tex., in June, to say nothing of participation at Frankfort, Mich.

Last year it incorporated. Its present officers, all extremely active, are: Dr. Klemperer, president; Stephens, first vice-president; R. A. Bailey, second vice-president, and Paul Hepburn, secretary and treasurer. It also has a board of directors.

Interest is increasing at such a great rate that the board is contemplating a soaring port, gliders, the appointment of an instructor, construction of a clubhouse and installation of equipment. However, there is no wild rushing ahead with such plans. The leaders are conservative and they wish to build solidly rather than swiftly. However, the need for facilities is being felt.

Roughly stated, the policy is to knit together all the different groups in southern California which are interested in gliding—men and women who build and operate gliders. So far, this has been done. The "gang" gathers on the second Friday of each month at the Aero Industries Technical Institute in Glendale, where the use of a large classroom has been donated. On the program are such men as Prof. Irving Krick, meteorologist; Otto Timm, airplane manufacturer; officials of the Civil Aeronautics Authority, and men holding responsible positions in southern California's swiftly-growing aviation industry.

The second important function is the planning and development of the annual classic—the Southwest Regional Gliding Meet at Arvin, held on two week-ends and comprising distance, altitude and goal competition. Most startling innovation in 1939 was an international broadcast from a glider in flight, accomplished by Stephens, Westphal and others, which put both Arvin and the association on the map.

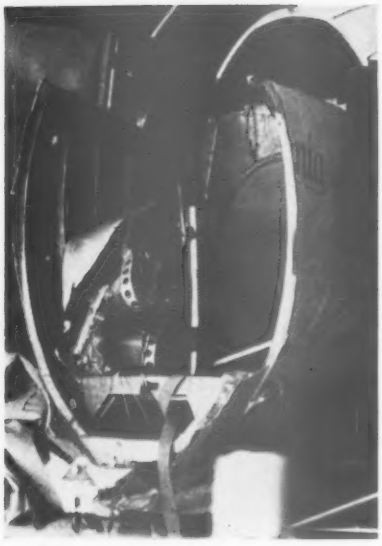
Members have been recruited from the San Joaquin Valley of central California while San Diego, 140 miles south of Los Angeles, has also contributed talent. The annual meet draws glider pilots from San Francisco, Salt Lake City, Portland, Tacoma and Seattle. In fact, every man who has a glider and lives on the western slope manages to get to Arvin in April.

Last year, it was estimated that more than 20,000 eager spectators swarmed the foothills to watch the pilots compete. Money didn't count with the contestants. Awards were made on a point basis and each participant who had any points at all shared in the prize money and collected unto himself at least one trophy. Heavy winner was Woodbridge P. Brown, a young man in his twenties who hails from San Diego.

The main trouble right now seems to be to get good gliders at reasonable prices. One highly successful member, Hawley Bowlus, long active in the association, co-designer of the *Spirit of St. Louis* and the gliding instructor who taught the sport to Col. and Mrs. Charles A. Lindbergh, sells a kit manufactured at his San Fernando factory for a little under $400. Gustav Briegleb, credited with building six ships with the initials "BG" in front of their numbers, also is putting out a ship in kit form for about the same price.

"This means," says Stephens, "that if five fellows go together out here they can build a glider, trailer and get all necessary equipment for less than $100 apiece. Of course, they'll have to work. Assembly of a kit means about a thousand man-hours of work. Those who assemble must have some skill. It's not child's play."

Those who wish to dodge the labor, the "you build 'em and I'll fly 'em" boys will have to spend about $800 or $900 for a finished job. At the moment



This is what Harvey Stephens' "Zanonia" looked like after its accident in Texas.

the association, long on youth and ambition and short on ready cash, builds 'em first and flies 'em afterward.

The organization boasts of several stars. Of course, there's Dr. Klemperer, who becomes more and more interested in the organization as time goes on. He was active in gliding in Germany after the World War. He came to America with the Goodyear Zeppelin Corporation, and ended up with his present job. But gliding is still his hobby and his first love.

Jay Buxton is the dean of the "lads." He has a daughter, Lucretia Buxton, who glides frequently in her father's two-place record-holder, *Transporter* and who, members say, "should be in the movies." Lucretia was with Dick Essery, another one of the stars, when the *Transporter* established the American two-place distance record of 126 miles between Wichita Falls, Tex., and Oklahoma City, Okla.

Westphal, with a record on both power planes and gliders, created the Pete Smith short subject, "Air Hoppers", and glided in it, thus increasing national interest in gliding. He has participated in many American meets.

Stephens, best known to the American public because of his film characterizations, is one star who fulfills his publicity notices. He spent $2,500 building his *Zanonia* by hand. He flew it 193 miles at Wichita last summer, hooked a wing and bashed in its nose at the end of the flight. Superstitious, and victim of a long run of hard luck, he swapped the *Zanonia* for "Woody" Brown's prize-winning *Thunderbird* and now both pilots seem to be happy.

Harvey Stephens

John Robinson, from Brown's home town of San Diego and a welder by trade, went to nearly 11,000 feet at Elmira for an official altitude record which was shattered shortly after he made it. The boys in the soaring association claim that he has done 17,000 feet in the vicinity of Palm Springs, Cal., where a winter meet is being contemplated this year—but Robinson and his *Robin* didn't do it officially. The *Robin* is a ship of his own design.

Brown and his *Thunderbird* stole the show at Arvin. He collected so many cups at the annual banquet after the Arvin meet that when Westphal asked him to pose for a picture his face was hidden from the camera. True, the checks were small—there's never more than a hundred dollars in the "pot" for the point winners—but the honors were plenty.

While Essery was bringing glory to the association by winning enough points to snare the Wichita meet, Brown wasn't napping. He established the American distance record in a goal flight from Wichita Falls to Wichita, Kans., a distance of 263 miles. Attempts are being made to have the F. A. I., the organization which fixes gliding records, credit him with a world's record for goal flight.

Women as well as the masculine members of the soaring association are active. True, a great many of the feminine contingent are content just to join and sit on the ground while the family pants-wearer goes aloft to out-do the eagles. They like the social side and also wonder, one might suppose, if hubby really went gliding after all. But Lucretia Buxton glides aplenty and has shown the ladies the way. Mrs. Jack O'Meara is another who isn't afraid to try her luck.

Lucretia Buxton

"And there'll be more," promises Lucretia. Until the *Transporter* was washed out recently—a gust of wind caught it on the ground while a friend was at the controls—she won plenty of converts. Her father is now building his fifth job in the family work shop and the Buxtons will be in the air at Arvin next April.

"Everybody who flies in the two-place glider likes it," Lucretia says. "We ought to have more of them. If we did have, more women would learn to glide. It's not hard when you have someone in the same ship showing you how to work the controls, as in a power plane. But it's something else again to get ground instruction and then trust yourself to cutting loose for the first time."

Stephens, Westphal and the others concur. They believe that more of their members will be getting into the air more often when more two-place ships are built.

(*Continued on page* 93)

L. W. M. A. P. T.

BECAUSE men in aviation are noted for their frequent and prolonged absences from home—on business, of course—aviation now has its newest organization. It is the League for the Wives of Men in Aviation, Poor Things. Organizer and Brood Master of the men's auxiliary is Jerome Lederer who, in his spare time, is safety engineer of the Aero Insurance Underwriters. L. W. M. A. P. T. headquarters have been established at 260 Riverside Drive, New York City. Minimum membership qualification is that the husband must be away from home at least one month per year engaged, presumably, on aviation business. Rookeries are being formed in all parts of the country. Each Rookery has a Squab Leader, a Keeper of the Nest Egg (secretary-treasurer) and Hatchers (membership committee). Symbol of the organization is a question mark on an unused pillow, upheld by a pair of wings. While the husband is at home L. W. M. A. P. T. members wear the insignia upside down. Latest word is that patiently waiting sweethearts also will be eligible.

Solution?

FROM Sweden, comes a possible solution to the serious bird problem around airports, according to Aero Insurance Underwriters. Some airplanes have been seriously damaged by running into flocks of pigeons, gulls and other birds. The farmers of Sweden were also bothered by sea gulls which raided their crops. It is against the law to shoot gulls. The farmers formed a vigilante committee, raided the rookeries, breaking all the eggs. But this did not help; the gulls simply laid more eggs. Then the farmers became statesmen. Next year, instead of breaking the eggs, they visited the rookeries with a saucepan and a stove. They hard boiled the eggs, put them back in the nests and let the birds sit and sit. Not only did they reduce the bird population but since half the birds were sitting only half were left to cause trouble.

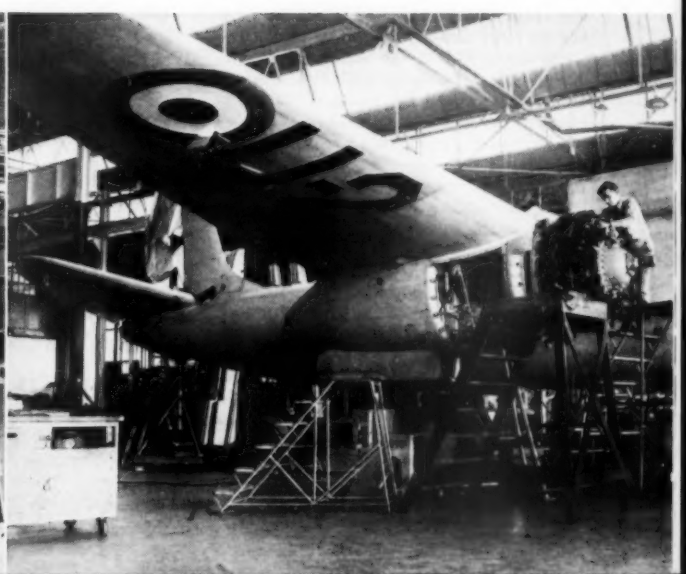
Frozen Gas

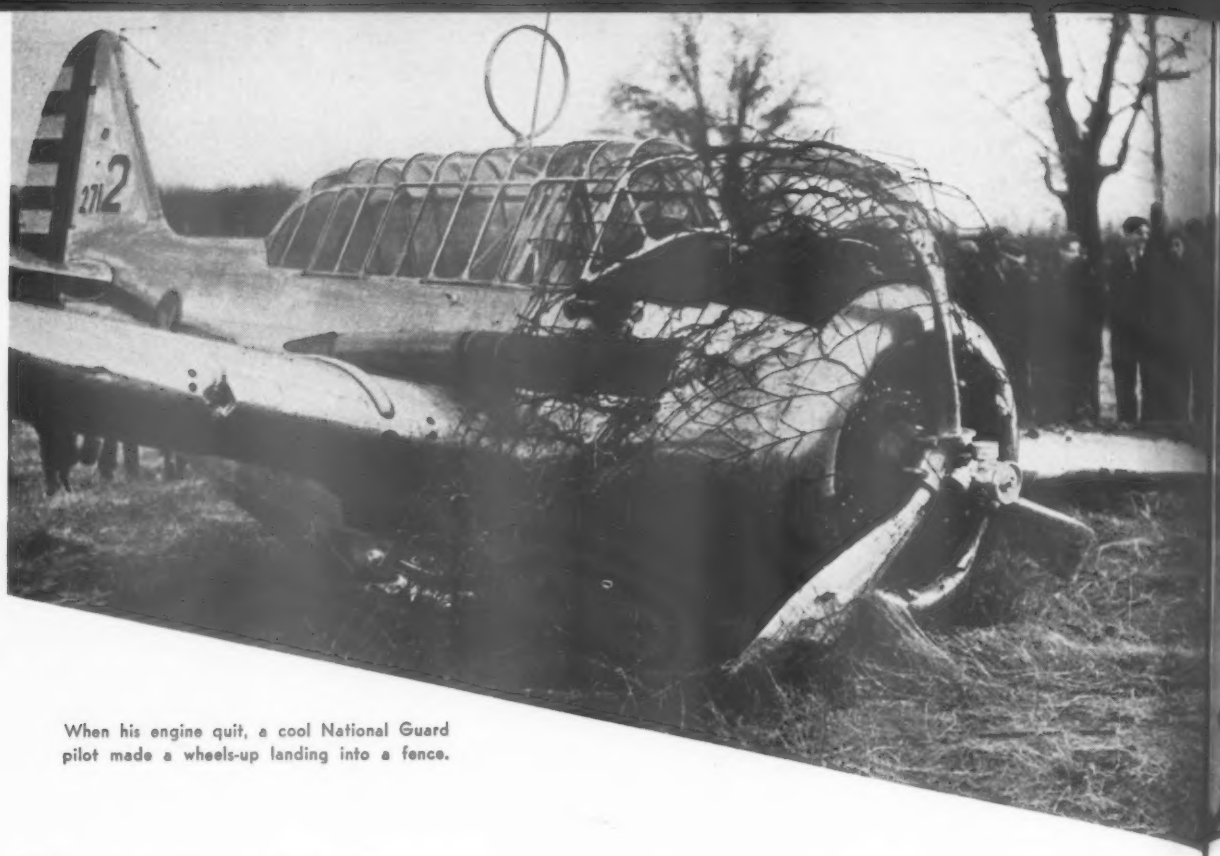
FROZEN gasoline may be used in aircraft of the near future, if a process devised by Assen Jordanoff, a Bulgarian aeronautical engineer now living in the United States, proves practicable. Mr. Jordanoff's new process is intended to eliminate the fire hazard of present high-test aviation gasoline by freezing it solid in the airplane's tanks. An additional device designed by Mr. Jordanoff is supposed to thaw out the fuel only as it is needed for the flight's continuation. Such a process, if adopted, would be highly advantageous, especially to military aircraft. Inasmuch as the frozen fuel will not burn or explode, warplanes so equipped would be comparatively unaffected by incendiary machine gun or anti-aircraft fire.

XUM

C. O. D. FRANCE

AMERICAN aviation engineers are eagerly awaiting word of the performance of the twin-engined Douglas DB-7's, shown on this page, against the best Germany can put in the air. The Army Air Corps is particularly interested because it has ordered a large number of similar ships. The planes shown here are part of a large number going to the French air force. The French model is powered with two 1,000 h.p. engines giving it a top speed of well over 350 m.p.h. Hydromatic propellers are standard. This tricycle-geared light bomber carries a crew of three, is heavily armed and carries a large bomb load. The cockpit hatch is hinged and opens sideways. First of these ships is expected to arrive at the front within the next few weeks.





When his engine quit, a cool National Guard pilot made a wheels-up landing into a fence.

Don't Fear Forced Landings

by Tex Rankin

Every pilot instinctively dreads the thought of a forced landing. Yet, he need not fear them if he is prepared. A veteran flyer passes on a few anecdotes and tips on being prepared.

FIRST of all, there was that forced landing in the orchard at Walla Walla. The plane was a brand new OX-5 Standard I'd unloaded and assembled at Spokane. I'd left the city three hours before, well along in the afternoon. It's just about 150 miles airline, but the ship only cruised at a little better than 50.

It was well after dark of a spring evening in 1920 when I arrived over Walla Walla. The landing field there was small. About 1,000 feet long. If I didn't head directly into the wind I was apt to overshoot. I pulled back my throttle and got down to about 400 feet near an arc light. The arc threw its illumination on trees just across from the field. By studying the trees I could tell the direction of the wind. After ascertaining this, I opened the throttle to circle and come in. The engine was dead. I had to think and work fast. When I discovered I could not glide to the landing field I decided to go into a nearby orchard. The orchard was a black patch easily identified in the night. I nosed down and glided over it. When I felt the wheels brush the first tree tops I pulled back on the stick. The ship stalled and pancaked.

I wasn't injured. But the propeller, two lower panels and the landing gear were damaged. Cost: $500.

The reason I chose the orchard should be obvious. I could have made a street. But I might have struck high tension wires extending across it. In rolling along the street I might have struck an automobile or a human being. I might have ground-looped, rolled onto private property, injuring property or a person.

XUM

This Army pilot chose the ocean for a forced landing in preference to rough ground.

I knew the trees were small, not over 10 feet hight, and resilient. Hence they were the next best thing, from a safety standpoint, to my field.

Even as early as 1920 I was having forced landings—and schooling myself to think in emergencies.. Of course, I shouldn't have had so many. In this case, however, the plane was partly at fault. The Standards were equipped with pressure feed to supply fuel to the Hall-Scott motors with which they were originally equipped. My ship had been changed over to the OX-5, with gravity feed, but no vent had been put in the gas tank cap. As fuel was used, a vacuum gradually built up in the tank. The moment I eased the throttle back the vacuum sucked the gas out of the gas line leading to the carburetor and the motor died. A friend of mine who bought the same type of plane had his motor quit 27 times before he figured out what was wrong—and made 27 dead stick landings without damaging his plane.

But this is not an alibi for the fact that I, in my optimism, took off late in the afternoon unequipped for night flying, believing that the ship was fast enough to get me home before dark. I didn't realize how slow the ship really flew. I never should have started. Once on the way, I should have set down when darkness fell in an open field which I could have made comfortably even with a dead stick. Had I persisted in continuing, a surer and safer way to have checked my wind drift would have been to come over the field very high. I could have spiraled with my motor wide open over the arc light and determined the wind direction by the drift of my circling plane. Then, if my motor had quit, I'd have had enough altitude to make my field. Or I could have circled the city several times until someone drove to the field and placed lights at the end of the runway. People will usually do this for you if you arrive after dark at a place where there is a field which has previously been used.

All of which shows that the best way to dodge a forced landing is by thinking hard a long time before it happens to you. However, I didn't—and barged right into trouble and had to get down the best way I could.

On another occasion during those days I was flying a Standard with a K6 Curtiss motor 2,000 feet over the sagebrush between Reno, Nev., and Boise, Ida. It was daylight. The teeth ripped off a cam gear. The engine stopped. I had previously determined the wind direction. Down we went into the thick sagebrush. I tore some linen off the lower wings. That was all. Had I tried to "stretch" the glide to an open spot I might have stalled the ship 25 feet above the ground and caused considerable damage.

Along toward the beginning of my flying career, after I'd come back from France, I decided to do a little barnstorming at Phoenix, Ariz. I was flying a C6 Curtiss Standard similar to the one I've just mentioned. One day I was asked by a young fellow and his girl friend to take them up and do some stunts.

"I'll give you a loop," I told them.

I got plenty of altitude and nosed down. The C6 wound up to 2,000 revs and the Standard thundered downward at all of 90 m.p.h. I pulled up the nose into the loop and was climbing vertically at the end of the first quadrant when everything happened at once. A blade of the propeller came off and apparently guided by sheet copper strips with which it was bound ripped through the lower wing three feet from the fuselage. The resultant vibration shook the carburetor, exhaust stacks, radiator and cowlings off the motor. The cowlings flew back, slapped against the wires and stuck there, acting as spoilers. All four engine mounts snapped. The motor settled onto its side. And all this took place while I was getting the throttle back and the ignition shut off.

In the general break-up I first thought the ship was shedding its wings. I was surprised to see them still there. At the same time it fell off into a spin. I kicked it out, shoved the nose down to a 45° angle to keep my speed up —the cowlings were certainly slowing me down—and looked around for some place to set the plane down without injuring my passengers. I picked a block in a subdivision. It was about 300 feet long. There were wires and I knew I couldn't get over them and stop on the lot. I went under. I landed within the block, without brakes, and fortunately did no further damage to the ship or to its occupants. I felt confident I could land the ship safely and went about doing it. One moment of panic at this point might have resulted in a serious accident.

Again, going back to the cause, *I was responsible.* The original C6 propeller

(*Continued on page* 68)

XUM

THE COST OF RUNNING AN AIRLINE

by MILTON VAN SLYCK

These airliners cost operators $100,000-$120,000 each. One major airline has 77.

Here is where the price of your last ticket to Anywhere goes. The pilot, greaseball, Uncle Sam and the switchboard operator all share it.

IT'S a pretty picture, that huge airliner framed with white clouds high up there. When you hear the throbbing motors and scan the skies, spot the flash of silver and watch the liner lazily pursue its course at a deceptive 200 m.p.h., many thoughts may come—but it's two to one the scene doesn't suggest dollar and cent signs.

Rather, it probably stimulates a feeling of thanks that you live in the United States where you can stand and watch the plane and not dash to the nearest bombproof shelter; either that or the sheer grace and beauty of the man-made bird holds you spellbound. But no matter what thoughts run through your mind, the fact is that during those few seconds you watch the plane, it travels a mile and is carrying a load of passengers, mail and express at the lowest cost in the history of airline operations.

The craft which daily span the continent mostly are commercial transports. These airliners are measured not for their ability to machine-gun and bomb terrified civilians, but rather with a yardstick demanding large pay loads, speedy, safe transportation and low costs. The air transport system represents a present-day miracle of efficiency and economy and behind it is packed a whole lot of hard statistics which, when translated into every-day language, tell a story unequalled even by the Arabian Nights.

For instance, although the plane costs $120,000 and there's a half a million dollars of insurance tied up on it and the passengers flying; although there are three crew members aloft, 31 men on the ground—all guiding its destinies; although passengers are being carried at upwards of 200 m.p.h., it is a fact that:

The average passenger fare is only a few mills over a nickel a mile; that airmail letters speed along for only six cents, coast to coast. Each of these figures represents a cost to the consumer less in amount than the lower-priced range in a popular "5 & 10" store.

It is not such a far cry from what now is a commonly accepted mode of communication back to the days when commercial air transportation was a laborious, expensive and adventurous proposition. Twelve or 13 years does it. In those days it cost around 35 cents a mile to operate airmail routes with no passengers. Today, sleek transports regularly whisk away hundreds of pounds of mail, 21 passengers and a complement of express—and all this is done for a cost per mile of slightly more than that prevailing in the old days. Moreover, there are infinitely more costly adjuncts, such as weather service, flight control and others which enter into present-day airline practice.

Yet, the average major operator now can operate an airline at a cost of only 67 cents a mile. This figure is applicable to the presently fairly well standardized Douglas DC-3. Everything is included in that 67 cents: landing fees, pilot and other personnel costs, research and development, advertising, free meals for passengers, fuel and oil, overhaul and repair, insurance, taxes and depreciation and management. This sounds incredible, perhaps, especially when it is considered that in addition to other costs, landing fees at just one of the many airports where a line may stop can aggregate $30,000 annually. Remembering,

XUM

too, that research costs some of the major lines $100,000 annually. Not taken into consideration are many of the features of passenger service provided by airlines and not provided by other transportation media—such as meals which cost a large carrier around $200,000 a year.

To run down each cost and to find out just why it is and what it represents, one airline recently assigned a statistically-minded Philo Vance to the job.

The first thing our aerial detective did was to track down the "Average Revenue Dollar." In the case of major airlines, it was found that passengers represented the largest single source of revenue. (He added that this didn't used to be the case; mail revenue formerly was the largest single factor.)

Splitting up the Average Revenue Dollar, it was found that passenger revenue accounts for $.5585. Next comes airmail revenue, which accounts for $.3514. These two aggregate nearly 91 cents of the dollar. The balance is made up of $.0420 air express revenue, $.0432 "miscellaneous operating revenue" and a little less than a half a cent of non-operating revenues, such as interest, etc.

So far our detective has had a rather easy time of it. But his task becomes more difficult when he unravels and traces the cost of the 1,001 various expenses and efforts which attract that "Average Revenue Dollar". For the sake of simplicity, our Vance of the skyways produced a very unusual person. Our arithmetical sleuth has dubbed him "Mr. Average". Mr. Average comes onto the scene because, says Philo, a hypothetical gentleman is needed who can represent the average cargo: passengers, mail and express.

We've seen how Mr. Average spends the average airline dollar. Now let's see what he gets for it and what he pays for each operation that goes to make up a completed airline trip. Mr. Average is a business man, says the statistician. As a passenger he's under 50 years of age and occupies an executive or semi-executive position. As a user of mail and express he's still a business man.

Up to now, Mr. Average never has thought much about the airlines, but publicity, advertising, sales promotion and other efforts make him conscious of the newer mode of transportation and lead him to pick up his 'phone and make a reservation with XYZ Air Lines for his next trip. Up to that point, XYZ Air Lines has spent exactly $.0742 of its average per mile operating cost getting Mr. Average to make a reservation. The minute the call goes through many things start to happen. A reservation clerk answers, the wireless starts to crackle as space is cleared for Mr. Average. A messenger boy brings his ticket and the next day Mr. Average arrives at the downtown ticket office of XYZ. There a traffic clerk takes down his name, weight and baggage weight, checks the baggage and Mr. Average takes a limousine out to the airport where he hands his ticket to another

A sizeable percentage of the airline's expense goes for sales personnel.

★

This statistical "pie" shows various costs in their comparable forms.

FUEL & OIL 6.20% OR 9.25%
SUPPLIES & SERVICE FOR PASSENGERS 2.80% OR 3.98%
PASSENGER SERVICE PERSONNEL 2.81% OR 4.21%
PILOT PERSONNEL 8.98% OR 13.40%
ALL OTHER PERSONNEL 14.93% OR 22.28%
DEPRECIATION (EXCLUSIVE OF RETIREMENTS) 8.52% OR 12.72%
INSURANCE & UNINSURED LOSSES 3.36% OR 5.02%
TAXES 2.74% OR 4.09%
ADVERTISING & SALES PROMOTION INCLUDES TICKET OFFICE RENT & COMMISSION 5.31% OR 7.92%
SALES PROMOTION & ADVERTISING PERSONNEL 2.10% OR 3.13%
ALL OTHER OPERATING SUPPLIES & EXPENSES 5.58% OR 7.98%
OVERHAUL, REPAIR MATERIALS & SUPPLIES 4.21% OR 6.3%

★

Overhaul and maintenance materials alone cost six per cent of every dollar.

The airline's pilot personnel costs it 13.4 per cent of every earned dollar.

counter man. Then he steps out to the plane.

Standing in the doorway of the awaiting plane is a neatly-uniformed, smiling young lady who checks him in. She is the stewardess. By this time, an additional $.1774 is well on its way to being spent, including $.0281 for passenger service personnel and $.1493 for all other personnel which takes in the mechanics, executives, stenographers and messenger boys—but not the pilots.

Mr. Average gets comfortably seated in the airplane. Motors begin to "rev" up and before he knows it, a mile has been covered . . . the same mile you watched the transport cover at the beginning of this article. That mile cost the airline exactly $.0620 for fuel and oil. Pilot salaries and expense cost $.0898. The $500,000 of insurance cost $.0336. A meal, which Mr. Average gets free, costs $.0267 for the average mile operated, together with all other supplies and service for passengers—

Every airline spends many thousands for passengers' meals and incidentals alone.

including electric razors, blankets, sheets, mattresses, pillows and many other items which go to make up the services provided a passenger in a day or sleeper plane. Behind the scenes and not visible to Mr. Average there also was spent $.0423 for overhaul and repair materials and supplies, $.0515 for all other operating supplies and expenses, $.0852 for depreciation of equipment and plant (exclusive of retirements), and $.0274 for taxes.

A recapitulation of the various costs which go into making up the 67 cents looks like this:

Pilot personnel	$.0898
Passenger service personnel	.0281
Sales promotion and advertising personnel	.0210
All other personnel	.1493
Supplies and service for passengers	.0267
Fuel and oil	.0620
Overhaul and repair materials and supplies	.0423
All other operating supplies and expenses	.0515
Depreciation (exclusive of retirements)	.0852
Insurance and uninsured losses	.0336
Taxes	.0274
Advertising and sales promotion, including ticket office rent and commissions	.0531
Total cents	$.6700

Running through all of these costs, with only two or three exceptions, is the amount paid for safety. It is present in overhaul, operating expenses, depreciation; in pilot personnel, fuel and oil costs. It is not known just how cheaply a modern airline can be run, because no airline ever has sacrificed maintenance and quality of materials where safety is concerned. This attitude and its expression in the constant supervision of all phases of operation by airline personnel has made possible the enviable record of uninterrupted service to which President Roosevelt recently called attention. The President said that it was worthy of comment that the entire population of Washington, D. C., could be flown to Boston, Mass., and back without a single accident, if the record were to be duplicated.

Out of this constant search for reliability has come development of safety devices such as the static-free directional beam antenna, the absolute altimeter, the blind landing system and refinements of engines, fuselage and wing design—all of which had their start, in some fashion, with the airlines.

The comparatively high fuel and oil expenditure is tied in with the cost paid for safety. Overhaul expenses are more largely a direct consequence of an attitude which "leans over backwards" in constantly checking on engines, wing and tail assemblies and other operations. These examinations many times tell operators of impending trouble far in advance of actual breakdown.

While there are a multitude of other factors making up the total cost of operating an airline, these are the main facts and figures of the why and wherefore of the 67 cents. Compared with the nickel per revenue passenger mile and the six cents which the government charges for an airmail letter, that 67 cents looks pretty big. But there are many reasons why airlines can sometimes show net profits (last year the airlines' income was greater than the outgo).

Going back, for instance, to the time that Varney Airlines was started (April 6, 1926) records disclose that Swallow biplanes were used. They cost about $50,000 apiece and operating expense was around 35 cents a mile. No passengers were carried. Therefore, mail revenues had to bear the brunt of all expenses.

How it is possible with an increase of only $70,000 in the cost of the plane and 32 cents a mile in operating expenses, to carry 21 passengers (against none in 1926) along with hundreds of pounds of airmail and express? The first answer, of course, lies in the technical advances. The cost per seat mile for a 21-passenger DC-3—providing all of the total operating cost of 67 cents were charged to passengers—would be $.0319 per mile. On the basis of present average fares, this represents a potential of nearly $1.07 a mile in passenger revenues alone, should all seats be full all the time. Actually, however, this is practically impossible in airline operation.

The 1940 airliner is more than twice as fast as some of its 1926 counterparts. Its comfort has been multiplied immeasurably, while safety is far greater. All this has attracted a greater volume of business which, in turn, has permitted lowering rates. Evolution from smaller airline units to the present larger systems is the second answer. The example of United Air Lines Transport Corporation—the outgrowth of four lines scattered from coast to coast—furnishes a

(*Continued on page* 90)

Some airlines spend $100,000 annually on research. Below: United's test ship.

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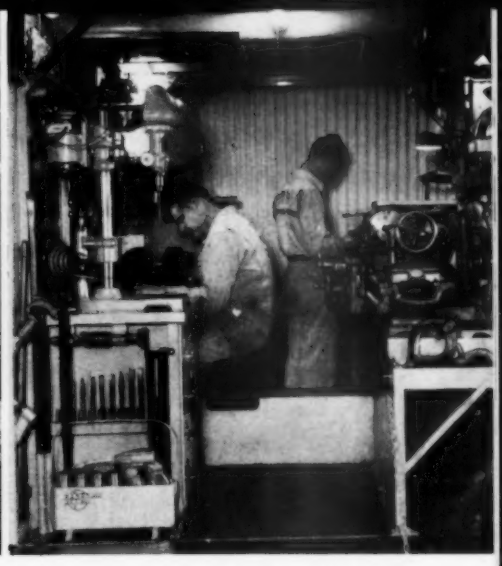
The French army already has purchased four of these mobile airports for servicing Allied warplanes at the front. The Chinese already have smaller models in use.



The unit contains a complete machine shop, lathes, drills and all other required tools.

ROLLING FIELD

by ALEXANDER McSURELY

Leave it to the Americans. Now, even the traditionally elaborate overhaul base is pocket size.

EVERYTHING you need for an emergency airport, wrapped up in a 13-ton "package" which will travel at a top speed of 40 m. p. h., on highways or by using caterpillar treads, over any reasonably level open country—

That is American scientists' newest contribution to World War No. II. Four of these "mobile airports", purchased by France at a cost of $200,000, are now or soon will be en route across the Atlantic to serve the growing French air force, each unit capable of transforming any good-sized cow pasture into a wartime flying field.

Developed with considerable secrecy by the Couse Laboratories at Newark, N. J., the field units had little publicity except for a private showing to U.S. Army Air Corps engineers at Wright field, Dayton, O., where one of the units was on display for two days, before it was returned to Newark for packing.

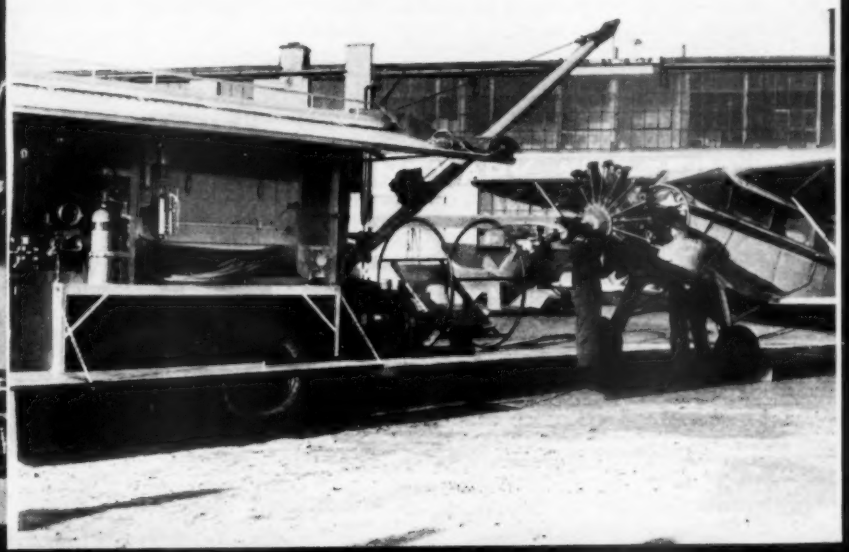
The compactly designed unit carries complete machine shop, lathe and drill equipment, tool kits for all the various special jobs incidental to airplane repair and a small but surprisingly complete stock of parts. Manned by a working crew of three: the commander, radio operator and driver, the rolling airport can spend three months or longer in field duty, as long as it is supplied with fuel, food for the crew and repair parts when its stock becomes depleted, according to Couse engineers.

Outstanding among its equipment is its lighting facilities, including 30 floodlights to bound the field, two spotlights with half mile beams and one light with a mile-long beam which serves as a landing light. The system is powered from a generator in the unit, which is designed to produce 110 volts AC or DC, 250 volts in three phases, 440 volts for arc welding and from four to 40 volts for battery charging. The gener-

(*Continued on page* 92)

Normal crew is driver, commander and radio operator. Unit can stay in field three months.

Complete major airplane engine overhauls are easily handled. Below, the unit's 2½-ton derrick lifts the engine off an airplane. Note special engine repair "cradle".



LIGHT-PLANE NOMAD

by

STEPHEN BATES

Walton St. John, Piper sales manager (left), discusses with Bill Strohmeier the latter's next sales trip. Strohmeier flies thousands of miles annually in Cubs.

Bill Strohmeier is the modern lightplane salesman—one of those fellows who make the traditional travelling salesman look like a hermit.

ONE thing will have to be thoroughly understood before this yarn reaches the professional eye of the printer, and that is that William D. Strohmeier (Amherst college, 1936) has never encountered a farmer's daughter during his peregrinations and, in fact, actually makes a point of avoiding them.

He may be a nomad flyer—one of less than a score of men in these United States who are in the air day in and day out as sales representatives for lightplane manufacturers—but he is not a Romeo with fresh-turned earth clinging to his boot heels. Maybe that's because of that incident on the eastern shore of Delaware about three years ago when a man stuck his head in the doorway of his bedroom at 3 a. m. and said, "Now don't get excited, Bill, but ——." That story comes later. And maybe it's just because he never has had an engine cut out on him for a forced landing in some 150,000 miles of cross-country work.

Anyway, let this be the story of that little coterie of men the public never hears about but which ranges far and wide over 48 states and the District of Columbia on a mission relatively new to aviation—keeping a sales organization well-knit and happy in the job of boosting the ever-growing number of average citizens who own their own airplanes. If Bill Strohmeier, physically on the rotund side and temperamentally an individualist of the first water, is typical of the liaison men employed by the lightplane manufacturers, it is because he takes his chores in stride and possesses a gift for making potential buyers feel that flying is just as safe as driving an automobile, and a good deal less dangerous.

In Bangor or Baltimore or in the wilderness of the Florida Everglades, fond fathers come up to Bill with an inevitable question: "How can my boy get into aviation?" His answer sheds a new light on the changing picture in the lightplane field: "If he wants to fly until his shoulders ache, let him sell. The field has hardly been touched."

Bill ought to know. Week after week, month after month, his trim coupe drifts in to land at Charlotte, Orlando, Waterville, Rochester, Danville, Charleston, Miami and dozens of other ports. Bill is like a mailman on his appointed rounds. Cub distributors and dealers never have to look at the calendar. The man in the coupe, bags, brief cases and "hell kit" stuffed into the baggage compartment behind him, always shows up on the dot. It is going on four years now that Bill has been winging around the country helping sell airplanes, and the new hasn't worn off his job. He is just a little wacky on the subject of flying. It's his means of making a living; and yet, last summer, consistently every weekend he flew from Washington, D. C., to South Dartmouth, Mass.—a roundtrip of 850 miles—to spend Sunday with his mother and father. Taking off in his Cub in the evening, he lazed down the Atlantic coast until he picked up the lights of New York. There he cut inland to make Washington in a breeze. He has his own tricks for flying at night. The lack of horizon

A hard landing in a Texas cactus patch is handled ably by the local garage man.

Keeping sales ahead of production is one of the factory representative's jobs. Above are Cubs awaiting delivery after test flights. Production of 12 ships a day keeps factory salesmen busy.

never bothers him. He trims on his wingtips, leveling them by spotting lights on the ground.

Friends in the transport or student-instruction business look wistfully at Bill and tell him they would trade jobs with him any time. Those are the times when the man in the Cub looks like the world's freest agent, when he has dinner in Boston and hops off in time to make a 9 o'clock party in New York.

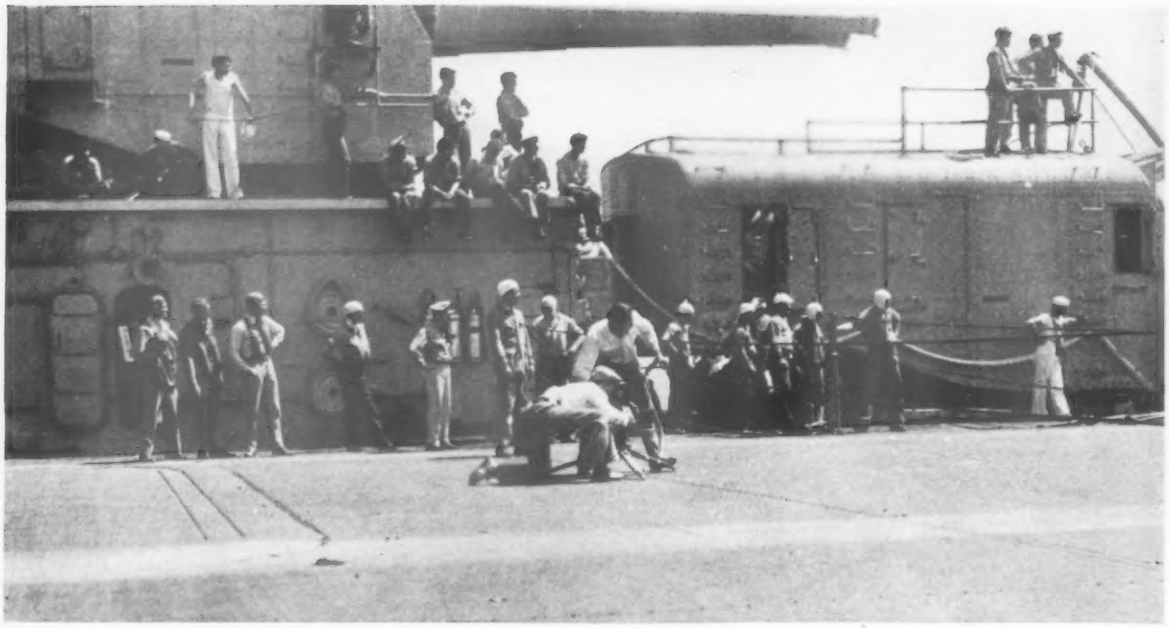
"Yeah?" says Bill, with his New England grin. "Maybe you'll change your mind when you sit down in a pasture in front of a storm front and feel a 30 degree wind whistling up your pant legs."

If intensive selling in the lightplane field, given added importance by the government's mass training program, is new to aviation, it has also drawn into it new sales blood. Sales forces must be peopled by men who not only know their products but know how to sell them too. Ted Weld, vice president in charge of sales for the Piper Aircraft Corp. (which employs Bill), used to sell electrical equipment. Walton St. John, the sales manager, used to sell radio equipment. Both were taken into the organization and taught to fly—because they could sell. Selling, perhaps, has created the last of aviation's nomads. Yesteryear's barnstormers, stretching a glide into Beloit or Kalamazoo in hopes of getting enough riders to buy gas for their OX-5's, have given way to the contract acrobatic flyers who want money on the line before they go aloft.

Like Bill Strohmeier, sales force nomads always are packed to go. They never know. They go out for a day and are gone three months. Clean linen always is a problem; they are seldom in one place long enough to send their shirts to the laundry. Letters trail them across state lines. Expense and salary checks sometimes never catch up with them. They must be expert judges of

(*Continued on page* 84)

The factory representative never knows what he'll have to do next. Here is Strohmeier's demonstrator torn down for indoor display at a sportsmen's exhibition.



Here is the author shooting the landing of a Navy plane on the deck of the aircraft carrier "Saratoga".

AIR CAMERAMEN *LIVE ON THRILLS*

by CHARLES MARSHALL

Shooting aviation motion pictures is a hair-raising business. An ace cameraman tells why.

WE were 6,500 feet over the Pacific, 60 miles from shore, and no ship was in sight when it happened. My pilot and I were perking along in an old Vought O2U, a two-place Navy scouting biplane. We had taken off from the aircraft carrier *Langley* a short time before to photograph fleet maneuvers for "The Flying Fleet," a motion picture. The *Langley* had steamed on out to sea to launch her squadron of fighting planes.

Without warning, the steady purr of our engine was interrupted by sharp pops. We had blown out two spark plugs. The motor chugged, coughed, started vibrating badly, the tachometer dropping to about 750 revs, not quite enough to keep us up. In those days, we had no radio. So we were just up there in a landplane, losing plenty of altitude. The pilot headed in the direction we thought we'd find the *Langley* and blew up our life preservers. Pretty soon we had only 2,000 feet.

Then we saw the *Langley*, dim under a veil of overcast. I started waving my arms. The *Langley* was going down wind, the deck elevator was down, leaving a 60 by 60 foot hole in the deck, which was clear of arresting gear, and the red flags were up for no landing.

The boys below gathered that something was wrong. I never saw a big ship get around into the wind as fast as she did. The elevator came up. The arresting gear went across the deck. The flags came down. And we were coming down, too. I'll swear to this day that my pilot lifted his ship five feet by mind alone as we slapped onto the stern end of the flight deck.

This time, as always, I didn't worry. My life has been full of such moments ever since I argued Joe Cohn, production manager of "The Flying Fleet" into the belief that because I could both fly and photograph I should be shooting air stuff. I've gone over on my back in a tri-motored Ford in Alaska (see POPULAR AVIATION, May, 1939); I've nearly been thrown from ships; pilots flying me have lost their control sticks; I've had some tough landings. All I have to show for all this is a little scar on my nose and occasional pains in the back of my head and neck from a bad landing.

Frank Tomick was flying the ship. The accident wasn't his fault. We had too much of a load in the plane, Paul Mantz' Stearman photographic ship. We were making "Too Hot To Handle"—the one in which Clark Gable was a newsreel cameraman. The production crew had set fire to a ship seven or eight miles in the Pacific. A phony fire, with stuff burning on deck. Dangerous and expensive. It was get it the first time or bust, so Frank and I left the Long Beach airport with two cameras on the landing gear, shooting straight ahead, and with two Bell and Howells for me to handle from my cockpit.

"Carry four cameras," they had told us. "We want to cover two different angles with four different length lenses." Batteries and cameras weighed 180 pounds,

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At right is the author about to take off with Earl Robinson, famed movie pilot.

gave us drag, too. We got the shots all right. We headed back, got over the field and discovered the wind had changed. That meant coming in the short way. He planned on landing far out. He went a little too far. Just as we got three points down and were doing about 50 we piled into a drainage ditch about 10 feet deep.

Tomick cut his jaw. I bumped my nose on the cowling. Ship and equipment were stacked. The cameras were torn from their fittings. Those on the free head just grazed my head, tore into the center section, bounced off the cowling, ripped through the lower wing and dropped to the ground. *But the exposed film was okay.*

As I look back on it, "West Point of the Air," with Wally Beery and Bob Young, was my hard luck picture. I had three tough breaks in a row. The first was the result of my own idea. I suggested to the director that a swell way to open the picture would be to make a diving zoom shot down on the words "RANDOLPH FIELD," the letters being white brick against a green lawn and the sign about 150 feet long.

Carried away by this brainstorm, I suggested that it would be even prettier if a squadron came under my ship while I was diving—a large formation of planes from the opposite direction.

"Swell," I was told. "If it works."

The squadron—48 planes—rehearsed for a couple of weeks. The fateful day came. To give ourselves some latitude to time the shot we flew high. My camera was mounted between the wheels shooting straight ahead and lined up with the pilot's gun sight. I had the pilot fly directly at the formation in a shallow dive. As it swept beneath us—that is, part of it—the camera photographed the sign. Thinking all had cleared, my pilot steepened his dive, as I had directed. We suddenly discovered that we were going head on into the last 18 ships at 160 m.p.h. I saw sure death coming straight at my face. I knew it would be quick and painless. I took a firm grip on the cowling and ducked. A vibration swept by—too fast to be seen.

"This is it," I muttered.

We missed the lead ship—that was the vibration we felt—by 10 feet. The pilot caught our prop wash and was blown 150 feet up out of formation. We landed right now. My clothes were soaked with nervous perspiration and I had to relax for a while.

That was just the beginning. We went to March Field for night shots. We decided to test the Army's 60-pound magnesium flares to see what we could get in the way of photographic light value. A quarter of a million candle-power. We took off, dropped a couple, which were pretty but not convincing. We got a second load of two and were taxiing down the field at 40 m.p.h. when one went off right under my seat.

It looked like a roman candle. I imitated a sky rocket. I dived over the side and sprinted. The pilot and I were neck

(*Continued on page 72*)

This is the Vought 02U in which the author had the experience described at the beginning of this article. Marshall is standing beside ship. Note camera on gun mount.

The Lake Erie College girls at right take their ground school instruction seriously.

THE GALS ARE FLYING

by GEORGE R. REISS

Women pilots at last are coming into their own. The C. A. A. has started training them.

Gertrude Meserve of Winchester, Mass., is 19, already has her flight instructor's rating.

FROM time immemorial loungers at airports have become accustomed to hearing, each time a student-training plane bounced awkwardly to a wingtip and one-wheel landing, the instructor in the ship stridently addressing his student above the noise of the motor something like this:

"Lissen, you!-h66-&eæ-&! Of all tha dumb!-5Hu'*5k! Why tha !-*hU&o'gh! don't you....." That'd be merely the case-hardened instructor—embittered and made cynical by countless thousands of narrow escapes from crack-ups at the hands of dumb students—setting straight his student on a fine point in the gentle art of flying an airplane.

But the procedure, these days, has been changed at the Lost Nation Airport at Willoughby, Ohio, and the airport fraternity has become accustomed to hearing an instructor, after a bad landing, pleading in a meek but exasperated voice, without the customary picturesque and fluent profanity:

"Now, listen, please, Miss . . ."

That would be one of the instructors busy with a member of the "powder puff class"—one of the two "powder puff classes" authorized under the Civil Aeronautics Authority's pilot-training program, by which it hopes to build up a vast reservoir of pilots within the next few years in case of any national emergency.

For 10 pretty young co-eds from Lake Erie College for Women at nearby Painesville, Ohio, are being taught to fly at the Lost Nation airport at Uncle Sam's very considerable expense and these, with the other co-ed flying students who are paying their own way, give the airport probably the nation's largest "powder-puff" class.

Only one other exclusively women's school—Mills College in Oakland, Cal.—is participating in the Civil Aeronautics Authority's program to teach about 11,000 pilots within this school year, although an occasional woman student may be found conspicuously in the flying classes of about 400 American colleges and universities.

The pilot-training program came as a very welcome windfall to Lake Erie College and to the Lost Nation airport. The college was probably the first women's college in the country to add an aviation subject to its curriculum. For the past four years aviation has had a prominent—and probably the most popular place—on the school's curriculum, sandwiched in among

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Five Lake Erie College co-eds pose for their picture with William Uhle, ground and flight instructor.

art, biology, chemistry, physics, economics, sociology, pre-medical, mathematics, philosophy, religion, dramatics, home management, music, education, history, government, languages and similar subjects.

The 10 students enrolled for the C. A. A. training are Nancy Gerhan, North Olmstead, O.; Jeannette Bricker, East Cleveland; Jean Fulton, Pittsburgh, Pa.; Anne Piskur, Cleveland, O.; Jane Parsons, New Philadelphia, O.; Lorraine Sterkel, Euclid, O.; Louise Ward, Ashtabula, O.; Barbara Hilditch, Erie, Pa.; Frances Woronowicz, Wilkes Barre, Pa., and Fern Milland, Pittsburgh, Pa. In addition, 20 other co-eds are enrolled this year in the college's regular aviation course which provides for demonstration lectures on operating and maintaining an airplane, parachute jumping, meteorology, aircraft structures and engines, navigation and other phases—and many of them are learning to fly, too.

"The main object of the course," says the college catalogue, "is to give the student a knowledge of flying and to afford her some experience in the actual operating of a plane." And this course, the college faculty will assure you, has done a lot so far to popularize aviation among young women in many mid-western cities and towns where flying was not considered "just the thing" for young girls.

In charge of the college's flight program is Dewey Eldred, head of a local flying service, a hulking giant and veteran pilot who recently set two important world's records for light seaplanes. Flying a Taylorcraft non-stop and without refueling from New York to Daytona Beach, Fla., and flying it also 2,000 kilometers (1,242 miles) he set a new closed course, non-stop, non-refueling record. Vernon Finzer is one of his flying instructors. William Uhle of Cleveland is ground school instructor and Mrs. Ruth P. Bartlett, professor of physical education, is director of the program at the college.

The Lake Erie College was included in the C. A. A. pilot training program as an "entirely experimental" idea, Robert H. Hinckley, chairman of the Civil Aeronautics Authority, told the college officials.

"Little or no data exists on the adaptability of women to group training as pilots," he said, "although individual women flyers have in many cases made distinguished records. The Authority has high hopes that experience gained during

Several of the 10 Lake Erie College girls enrolled in the C. A. A. course have advanced to their first cross-country flights. Below, Instructor Uhle outlines flights.

the coming school year will furnish encouragement for wide-spread entrance of women into aviation."

Lake Erie College for Women is the last college you would expect to find participating in the C. A. A. pilot-training program or to offer aviation as a subject. It fairly drips conservatism—the type of conservatism that aviation finds so hard to overcome. It's a straight-laced institution, dating back to 1847 when it was founded as the Willoughby Female Seminary and later it became the Lake Erie Female Seminary with a curriculum appropriate to the name. Today it is a school with a lot of traditions, a rigid and carefully-selected curriculum designed especially for refined young ladies and with an ancient campus studded with ancient red brick buildings and shaded with huge stately elms.

Its students are chiefly young women from the better-class old Ohio families who wish their daughters to study in refined circles and are willing to pay for such atmosphere. Imagine, then, the consternation when the college, in the 1935 school year, announced that in addition to its standard subjects it would have a course in aviation. Parents and the female members of the faculty were astounded and shocked, but Earle L. Johnson, a veteran airman and now Ohio State Director of Aeronautics, is a trustee of the college—and he wanted it. The girls were enthusiastic about the idea and hurried to enroll in the course. It was an immediate success. Almost any day now one can find a group of the co-eds, clad in greasy shirts and breeches, busy at the airport in scrubbing up an airplane or tinkering with an ailing motor in the hope of wangling a bit of extra flying time or a free ride. The girls spend a good deal of time at these chores, in preference to many of the pastimes in which the average college girl is interested.

In 1936, the Lake Erie College Flying Club was organized and became affiliated with the National Intercollegiate Flying Club. When the Civil Aeronautics Authority began toying with the idea of teaching college groups to fly, Lake Erie College was one of the first to apply, the girls clamoring for a chance for the pilot training. But the college was not among those selected for training the 330 experimental students.

But when the C. A. A. program was broadened the school promptly applied again and half the college's enrollment sought to enter the classes. But only 10 students were selected by the C. A. A.

Now Dewey Eldred, the old-timer,—and the old-timers usually are singularly antagonistic to women in aviation—is quite enthusiastic about the chances of success of the girls' classes in the C. A. A. program.

"It appears," he said, "as though this class is going to prove for once and for all that women flyers aren't unnatural freaks—that any group of alert, intelligent young women can learn to fly as rapidly and as well as a similar group of young men; and that flying definitely has a place in every college—a women's college as well as in a men's college.

"That's what we intend proving."

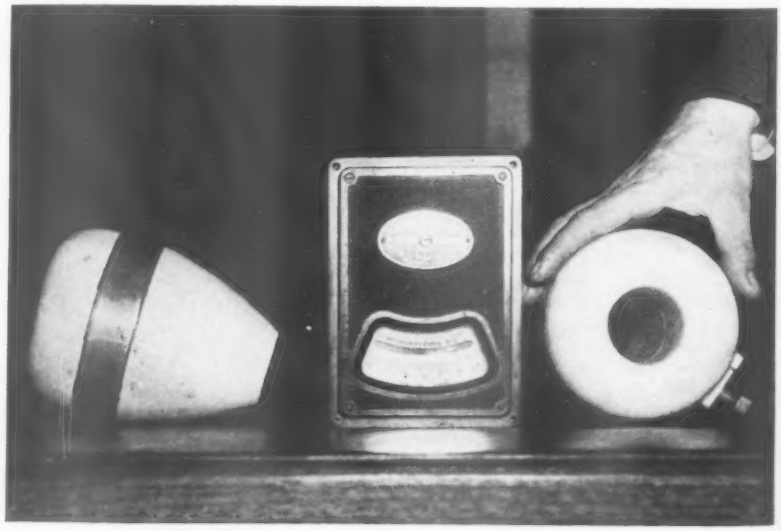
END

"Smilin' Jack's" Plane

ZACK MOSLEY, creator of the cartoon strip "Smilin' Jack" (see POPULAR AVIATION, February, 1939), recently purchased his first airplane. He and Mrs. Mosley are shown above shortly after having taken delivery on their new Piper *Cub Coupe* at the Piper factory, Lock Haven, Pa. Their first long cross-country trip in the ship was with the lightplane mass flight to Miami (see page 18). Mosley has been an active pilot for several years and spends much of his leisure time at Roosevelt Field, Long Island, New York. Incidentally, there really is a Downwind at Roosevelt Field. His last name is Jackson, too.

"Thermal Sniffer"

LATEST gadget for soaring pilots is the "thermal sniffer" shown below. It was invented by Gustave Raspet, a student at the University of Maryland and an amateur glider pilot. The device is intended to locate thermals and technically is known as a thermal gradiometer. With the egg-shaped devices below installed on each of the glider's wing tips, the "sniffer" records the difference in temperature between the two wing tips, recording accurately to within 1/10 of one degree. The pilot merely notes the difference and can tell when he is approaching a warm air current. The instrument's thermocouple wires are so delicate they were welded together underneath a microscope. Gliding experts have expressed interest in the device.



XUM

Above is the old Douglas biplane flown around the world by Les Arnold (inset).

Very Quiet Birdman

by WILLIAM HAMILTON

People hear very little from or about Les Arnold these days. But he's decidedly one of the kingpins in aviation today—as he was 15 years ago.

FIFTEEN years ago the late Arthur Brisbane wrote in his beloved column: "There will be others who will fly around the world, but these men will be the only ones who can say they were the first."

He was referring to a courageous band of six U. S. Army flyers who had just completed a breath-taking flight of 28,000 miles. For the entire summer of 1924, four Douglas-built biplanes pointed their blunt noses ever westward to complete a thrilling air trek from Seattle to Seattle via Alaska, Japan, India, Europe, Iceland, Greenland and Labrador. Since that glorious day in 1924 when the three 'round-the-world planes wrote history by returning safely to Seattle, these six men have helped write the dramatic chapters of aviation progress that have been recorded in the past 15 years. Only two planes and four men actually completed the entire circuit of the globe.

They have read of other globe-circling conquests, have seen the names of Wiley Post, Harold Gatty and Howard Hughes blaze in newspaper headlines as engines, airplanes and navigational aids improved with the passing of each year. To sketch the different courses pursued by these six gallants of the air during the past decade and a half would require weeks of research and several volumes of space. To talk first hand with each of the six would necessitate trips to South America, Seattle, Los Angeles, London, Pittsburgh and to New York.

As the smoke of a cigarette curls toward the ceiling we are living 15 years ago—re-living the epochal Army flight with Les Arnold. The clock has just struck midnight. We have just spent a very pleasant evening with Arnold. We have seen his trophies, his pictures, his 'round-the-world den and talked for four or five hours about various phases of the flight. But don't get me wrong; Les Arnold is no easy man to talk with about that trip. He'd rather discuss airline economics, airline operations or airline personnel problems. At 43, Arnold is even more wrapped up in air transportation than he was at 28, when he was chosen from 150 picked Army flyers for the dangerous trek around the globe.

Perhaps you guessed it; Arnold today is an airline executive. He holds down the vice-president's post for Pennsylvania-Central Airlines and is the right arm of C. Bedell Monro, PCA president. He regards the 1924 flight in a very matter-of-fact way and seems to be more excited about the fact that today, on regular schedules, air travelers can go around the world in 16 days.

A native New Englander, L. P. A. (as he is known around the PCA headquarters building at the Allegheny County airport) was born in New Haven, Conn., and later lived at New London. When he was 21 years old, the World War broke out and he immediately enlisted and was taught to fly at Waco, Tex., after completing his ground work at Princeton University. Before going overseas he was trained in gunnery at Fort Worth, Texas. Eager for a chance to do combat flying, the youthful and enthusiastic Arnold was disappointed, for he was assigned to front line flight duty just three days before the signing of the Armistice. For a year or so later he was with the Army of Occupation in Germany.

Sailing home, young Arnold was looking forward to a nice long visit with his family in New London. On arrival in New York he said good-bye to his buddies and entrained for the picturesque Connecticut seaport town. The family visit turned out to be just 6 hours in length. He had no sooner greeted the family when a wire arrived advising that two of his wartime companions had signed to accompany their overseas squadron for a tour of duty in the South and they had added Arnold's name to the roster. The old Army spirit flared again and he was off for New York. The train connection for Millington Field near Memphis was so close that he had to leave his trunk in New York

The around-the-world flyers, from left to right, are: Capt. Lowell H. Smith and Lieuts. H. H. Ogden, Eric Nelson, Leigh Wade, Jack Harding and Leslie P. Arnold.

and it was six months before it caught up with him.

The climax of a brilliant career with the Army Air Corps came in 1924 with Arnold's assignment to the globe-girdling flight. While preparations for the hop were being made at the then-small Douglas factory in Santa Monica, Calif., the flyers became acquainted with leaders in the film colony. Among the most famous screen stars of that decade was Priscilla Dean. The night before the first hop to Seattle, Miss Dean had met the flyers and asked Lieutenant Arnold to carry a toy monkey with him as a mascot on the trip. During the air voyage tools, clothing, equipment and numerous other precious articles were discarded at various stages of the flight to conserve weight—but not once was the little toy monkey removed from his perch in Arnold's cockpit. Once back to the United States the casual acquaintance between Priscilla Dean and Arnold blossomed into romance and in 1928 they were married. It was about that time that the executive ability of Les Arnold was coming to the fore. Even keener at aviation as a business man was Arnold than as a pilot. The Maddux interests were organizing one of the predecessor companies of Transcontinental and Western Air and Arnold took over an executive post. Then TAT was formed and, from that, grew the present TWA structure with Arnold playing an important role in every stage of the TWA expansion.

Three years ago Arnold was serving on the directorate of an airport company jointly owned by TWA and Pennsylvania Airlines. C. Bedell Monro was quick to recognize the genius of Les Arnold and confided with him about plans for the merger between Pennsylvania and Central Airlines.

"When this merger is completed," Monro told him, "I want you with us." And so with the formation of Pennsylvania-Central Airlines, Arnold left TWA to take over a vice-president's chair with PCA.

If you're an extra-special friend of Les Arnold you might persuade him to show you the inner sanctums of the Arnold household—the 'round the world den. The wall is lined with historic pictures illustrating various phases of the famous 1924 triumph. In one picture Calvin Coolidge is grinning broadly as he shakes hands with Arnold. This was when the flyers landed at Washington on their return. I'm sure our readers know how difficult it was to extract a smile—much less a broad grin—from the poker-faced Coolidge. To this day Arnold is trying to remember what remark he had made to accomplish the impossible with the late President.

Bookcases that frame the Arnold desk show an excellent taste for literature: a complete set of the Harvard Classics, a variety of excellent current literature, including "Gone With the Wind." But conspicuous by its absence was the famed chronicle of the 'round-the-world trip by Lowell Thomas. Notable among the trophies in the den are the certificates that were awarded at the time Arnold was recipient of the Distinguished Service Medal, Japan's Imperial Order of the Rising Sun and the French Legion of Honor.

Among other things, Les Arnold serves as personnel director for Pennsylvania-Central. Right now he is deeply engrossed in preparing material in anticipation of the PCA's proposed routes in the south. He has conducted much of the preliminary survey work between Pittsburgh and Birmingham and Atlanta. In fact, one of the best Les Arnold stories originates from Birmingham. It seems that Arnold and "Slim" Carmichael were appearing on a 15 minute radio program there. Arnold was to interview Carmichael about a flight that resulted in

(*Continued on page* 88)

Dangerous Wire

A SHIP landed at the field and, when the pilot drew up to the line, he found his little cabin full of rolls of loose antenna wire, an insurance inspector reported recently. The lock nut on his antenna reel had come loose and when he attempted to operate it the wire had backed up on the reel and filled the cabin full of coils of loose wire. It so happened he managed to control it but it may have become wrapped around the controls or his body and caused serious damage. All radio operators should inspect their antenna reels often to see that the guides are in proper shape and that the plunger and handle are functioning properly.

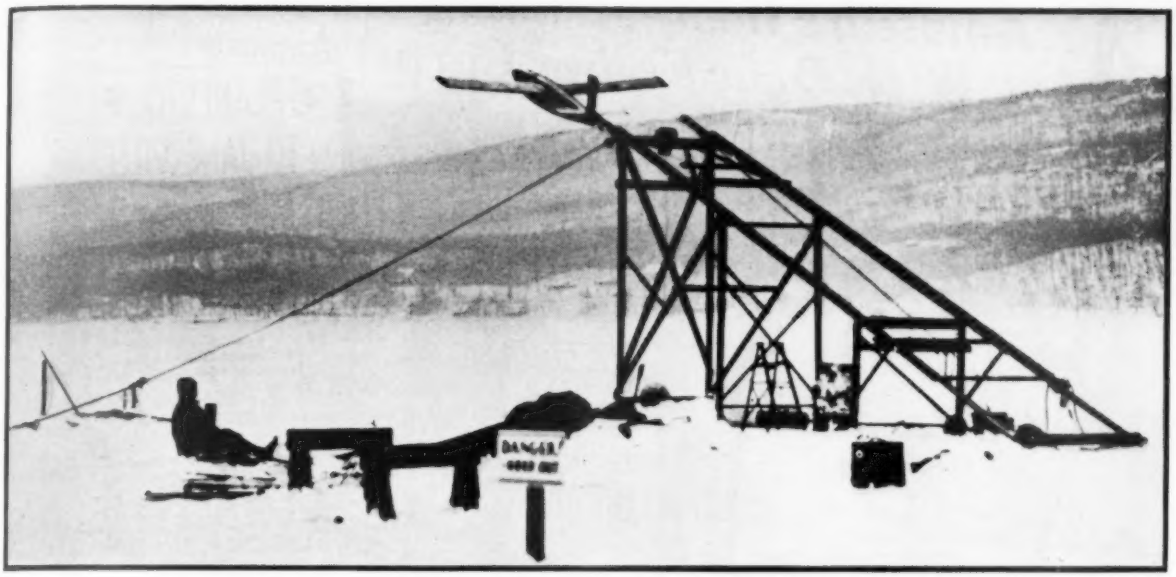
Some of the new ships have their radio antenna feed through the fuselage out of the back and have a cone shaped device at the end to stop the antenna from whipping. This device on the end seems to attract the usual hangar "antenna pullers, gadget pushers and fabric stepper throughers". A pilot recently, after taking off with this kind of an antenna on his ship, attempted to unreel it to transmit and realized his transmitter was not putting out. Upon landing he found that the antenna had been pulled out in the hangar and pulled off the reel, thereby jamming the wire around the spindle. A further hazard is present in that the spindle is not insulated which would tend to ground out the antenna. Some means should be devised of locking the cone that is on the end of the antenna to the fuselage so that it cannot be pulled out in the hangar.

New Hose

PERFORMANCE reports on a new type of airplane refuelling hose recently announced by the B. F. Goodrich company reveal the development of a synthetic rubber-like substance to fill a need of the aviation industry for a hose made of material which will not deteriorate in the presence of gasoline and petroleum products. Tests by major oil companies which have refuelling contracts at airports all over the nation have confirmed this characteristic of the hose.

The hose was developed to provide a substitute for hosing made of natural rubber which, being an organic vegetable matter, has a tendency to disintegrate in contact with certain oils. It was felt that the possibility of small particles flaking off and passing into the motors constitued a menace despite the strictest possible precautions. An added feature of the new hose is the incorporation of safeguards against dangers due to stored up static electricity which is generated in the plane by the flow of air across the surfaces of the plane in flight. Woven into the sturdy braid of the hose is special rust-proof stranded stainless steel wire. Thus, when the plane is being refueled, any static electricity which may exist is conducted harmlessly to the ground through the wire and couplings.

XUM



The above was an attempt to fly mail in a rocket plane in 1936. It flew a few yards and crashed.

ROCKET PLANES YET?

by JAMES P. EAMES

The rocket still may find its place in commercial aviation. Tests have indicated its future value.

A THUNDEROUS roar trails away to a screaming crescendo. We look sharply heavenward. Expecting to have fully a squadron of fighting planes confront our eager gaze, we are startled to see only one huge craft streaking across the azure sky, billows of oily black smoke trailing in its wake. But what a ship it is! Looking like a huge projectile, it is characterized by the complete absence of wings or, in fact, of any form of lifting surfaces whatsoever. What is it?

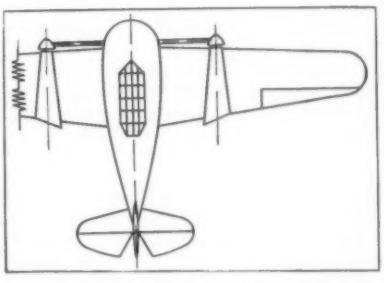
In answer you are told that it is a rocket ship propelled not by the conventional gasoline or diesel engine attached to a rotating propeller, but by means of the jet propulsion principle. Further questioning finally divulges the fact that the anticipation of regularly scheduled rocket flight is not an insubstantial dream or a "stunt" but a definite reality. Many well known and reliable aeronautical engineers, hopefully seeking some new development to satisfy the persistent demand for more and more speed, have come to accept the rocket type of craft as a possible solution.

The jet propulsion engine which constitutes the principal "innards" of any rocket ship depends upon the interior recoil created by exploding gases within its combustion chamber for its operation. The initial part of the operating cycle which governs jet propulsion output becomes very similar to that utilized by the conventional aircraft power plant. The combustion gases, derived from the burning of explosive fuels, instead of being directed against a piston, are ejected rearward at high velocity. The terrific pressure generated by the expanding combustion gases is effectively relieved as far as its action against the rear wall of the combustion chamber is concerned, since the gases are freed at this point through a venturi or nozzle-shaped tube. Since the pressure acting against the forward wall is unrelieved, a definite difference of pressure is made to exist within the confines of the combustion chamber. It is upon this difference of pressure that the rocket ship relies for its forward motion. All of this is in accordance with Newton's Third Law of Motion which states that, "For every action there exists an equal and opposite reaction." A practical application of the above phenomena which many of us have experienced lies in the "kick" encountered when a high-powered rifle is fired. This recoil merely represents the reaction forcing the barrel of the gun rearward, while the original action catapults the bullet forward. Employing this same analogy, we may say quite correctly that a rocket plane simply kicks itself along.

The performance characteristics of a rocket ship, chief among them being forward speed, depend primarily upon two important factors. The first of these involves the total weight represented by the rocket structure and the load carried. Advances in modern metallurgy have been such as to permit a light, strong structure, suitable for jet propulsion installation, to be manufactured. By far the greater part of the total load transported will, naturally comprise the enormous quantity of fuels required for extended flight. The second factor concerns the jet velocity of the ejected combustion gases. The attainable values of jet velocity become entirely dependent upon the type of fuel burned within the combustion chamber of the craft.

There is no mystery involved in the forms of fuel used by rocket planes, since they are all substances which we encounter in everyday usage. Such fuels may be of the dry or solid type as well as of the liquid type. The former materials—a variety of gunpowders, smokeless powder

(*Continued on page* 88)



A rocket-powered transport by the author.

MILWAUKEE NEWS-SENTINEL,
Amateurs Boost Aviation With Own Flying Corps
Breakfast Hops o Sundays Evidence of Activities
By ROBERT S. KLECKNE
The butcher, the baker and candlestick maker have taken the air in Wisconsin.
Don't be surprised if the who delivers your groceries or man who reads your electric m or even your doctor or
an accomplished
Women Also Airminded
15,000 PERSONS AT AIR SHOW
Program Is Closing Feature of Corps' Summer Season
45 PLANES TOUR TO JANESVILLE
end Hangar Dedica- on; Flight Is 5th in Air Corps Series
CIVILIAN FLIERS RACE SUNDAY AT AIR SHOW
Trophies Offered in ontests at Curtiss-Wright Airport
175 TO MAKE CHICAGO HOP
50 From Wisconsin Will Go on Breakfast
AIR PROGRESS DAY MARKED AT CELEBRATION

IT TAKES HEADLINES!

by ROBERT KLECKNER

Your local flying organization wants and needs publicity. The author, a newspaperman, presents some suggestions for the publicity committee.

SO YOU want to help aviation? Then crash the headlines—not with your plane, but beneficially.

Of the hundreds of civilian and professional aviation organizations throughout the United States, there is not one in 20 that has its eye cocked on good publicity for the purpose of selling flying to the public as a sport, a necessity and a public service.

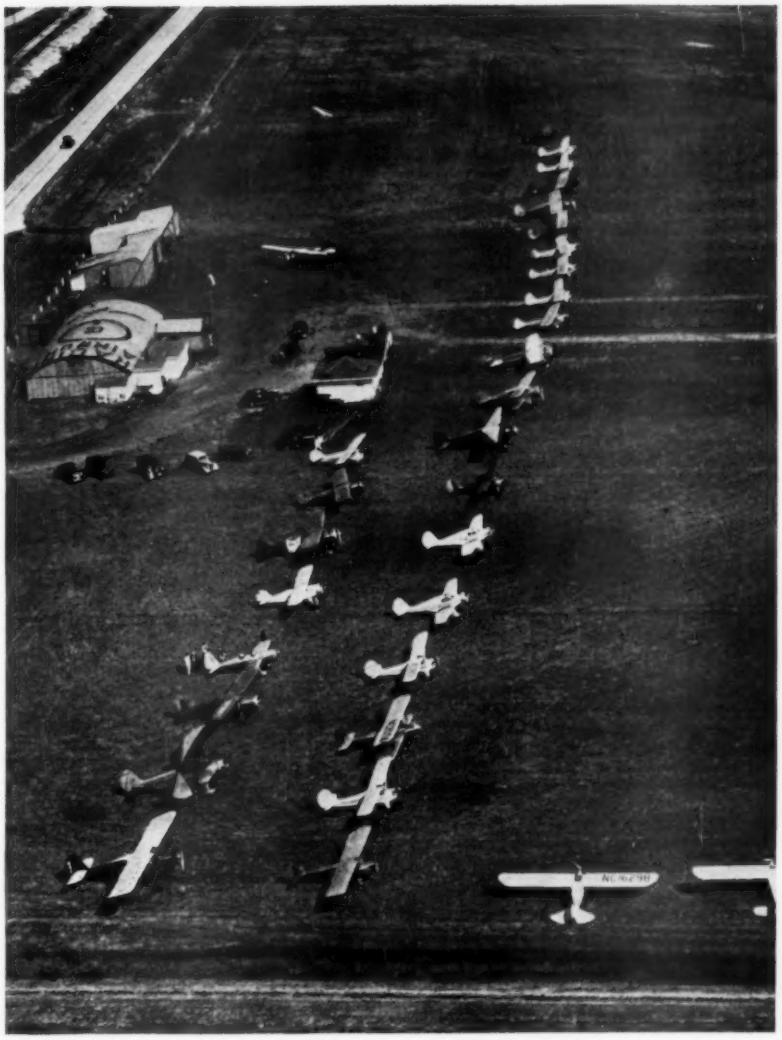
There is scarcely a city or hamlet in the country that does not have some sort of a group of organized flyers, most of them everyday citizens who, in their regular working hours, do everything from drilling teeth to oil wells. But does the citizenry at large know it? That has been one fault with civilian aviation. It has been hiding its lure and accomplishments under a basket so that the matter of flying is shrouded in undeserved mystery and haloed with awe. It is a safe 10 to 1 bet that John Jones does not know that his physician or groceryman is a flyer in his spare time, or why he is, or what public service is being rendered by the Whoosis Aviation club.

The Wisconsin Civil Air corps, for example, has found the answer in making Milwaukee and the entire state of Wisconsin aviation conscious. The answer was in one word—publicity. Good publicity for your aviation organization is not hard to get and once it is started it is easier to keep going. City editors of metropolitan newspapers are not the hardboiled lugs that the movies would have you believe. True, they are ever alert to the proximity of their huge wastepaper basket, and that "hell box" gobbles up gleefully unworthy publicity —stories based on gags or even fabrications intended to plug something for an individual's gain.

But on the other hand, they are sym-

Newspaper editors always are interested in the activities of local private flyers. Scenes like this are sure to attract news photographers to your flying function.

Good photographs of your meet are invaluable in getting space in local newspapers.



pathetic to and desirous of boosting worthy groups which contribute to the well being and development of a community. Only requirements for obtaining newspaper space are that the subject is newsworthy and the purpose laudatory, not for profit.

During the past year the Wisconsin Civil Air Corps has had reams of publicity to the end that hundreds of thousands of persons now know the name and purposes of the organization. Other thousands—60,000 at one time—have seen members in action putting their planes through their paces. Scarcely a week goes by but what there is a news story or two about the organization carried not only in Milwaukee papers but by the press service, giving the stories to all the papers in the state. The Wisconsin Civil Air Corps now has become an assignment on the city editor's day or night book depending upon what function the organization is sponsoring and when.

As a result of this favorable publicity —and don't think it happened by accident—hundreds of persons who once looked upon aviation as a rich man's hobby or something that would be all right for George but not for me, now have picked up the habit of going out to airports to see what the boys are doing. They're getting curious about what makes the prop go around and how many miles can you get to the gallon in this job or that. In other words, curiosity has been aroused and when a man or gal becomes curious about a plane it won't be long until he or she is up in the air. Then learning to fly is the next step and aviation has another booster.

Now don't get the idea that all publicity appears in the news columns of your local paper—although that is the starting point. Publicity is visual everytime a plane passes overhead. It is vocal whenever someone talks aviation. It is psychological whenever someone thinks about it. But it must be, to become effective, planned.

There are a few simple rules to be followed if you wish to publicize your own aviation organization and the author, being a newspaper man, will take the liberty of outlining a few pointers with the hope that your Whoosis Air Corps crashes the headlines.

First: appoint a publicity committee with a chairman who is personable and can make friends easily.

Second: see that the publicity committee gets acquainted around the newspaper offices.

Third: see that the committee keeps the newspapers informed of coming events.

Fourth: see that those events, when they happen, are interesting enough that a newspaper will want to know about them.

Fifth: have all information, complete names, local addresses, business affiliations, etc., available on each participant in that event so the newspaper can get it readily.

Sixth: don't try to tell a city editor—or reporter what is news and what is not news. He wouldn't tell you how to fly your plane.

Seventh: don't make a pest of yourself. Never talk over the telephone to a newspaper a second longer than is necessary —there may have been a triple murder while you have been talking.

Eighth: keep abreast of community and national news to see how your organization might fit in to better its own position in the matter of service.

If your organization is "cold" on publicity, perhaps the best start to be made is merely to have your publicity chairman at first send a post card to the city editors of each paper announcing the date, place, time and speaker or subject for your next meeting. Send that three or four days in advance. Then the afternoon of the meeting, telephone the paper, ask for the city desk and inquire *briefly* if the city editor would like someone to telephone the facts to the paper after the meeting. The answer usually is affirmative.

After that procedure has happened a couple of times, the paper will start calling your group. Then be certain the city desk has the names and telephone numbers of your publicity committee.

Personal contact with newspapers is important. Reporters are easy to get acquainted with and so are city editors—if you don't take up their time when they are busy. Invite a reporter or two out to the airport on his non-working days and take him and his girl friend for a hop. He won't forget. Maybe that's subsidizing, but it pays in ink.

Important also is the tieup with local events and national news. For example, if your county or state has a fair, have your organization put in an exhibit of some kind with a member there all of the time to explain apparatus. Fair sponsors are always glad to have an "Aviation Day." At the last Wisconsin State Fair the governor proclaimed Aviation Day and members of the Wisconsin Civil Air Corps made formation flights over the fair grounds before thousands of persons. That got a lot of ink and some pictures.

When the National Youth Administra-

(*Continued on page* 82)

XUM

Pioneer Ace

MARCH 1915. A cold grizzly dawn blanketed the tarmac of MS 23 Squadron at Luxeuil. A pilot, bundled in a fur-lined "teddy bear" suit, gunned the motor of a tiny Morane-Saulnier. The little highwinger darted down the field, its small wheels bouncing perilously over the frozen ground. Halfway down the dreary field the Morane zoomed, banked and shot over the black canvas hangars. The pilot waved to the men standing on the apron below and headed for the German lines. Lieutenant Eugene Gilbert was off on a self-appointed patrol to prove the practicability of his theory—that a single-seater airplane was the logical type for fighting instead of two-seaters.

Serious faced grease balls exchanged glances. Some felt that they had seen the greatest peacetime flyer of France for the last time. All agreed that Gilbert's idea was a ghastly, hopeless brainstorm. It was preposterous to imagine that a single-seater pilot could fly and fire his childish contraption with anything but tragic results against the Boche two-place L.V.G's. The E.A's had a pilot who had nothing to do but maneuver out of danger, and a rear gunner splendidly armed with swivel mounted Spandau machine gun. They admired the young Frenchman's bravery and cursed his foolhardiness. Gilbert was unquestionably intent upon committing suicide in the air. His silly brains would be shot out by one Spandau burst.

Gilbert viraged his flimsy little Parasol of fabric and many wires across the German front line trenches, dodging enemy high explosive shells. He looked overside at his "invention"—a four-shot Winchester rifle attached to the side of the fuselage. It was set to fire, by a wire attached to the trigger, through the revolving propeller. Roland Garros was one of the few MS 23 pilots who had given him encouragement and assistance.

Hope was high in Gilbert's chest. To him it was ridiculous for the French command to designate two-seater Caudrons and Farman pushers, mounting Lewis and Hotchkiss machine guns, as *pursuit de chasse* fighting planes. It was even more foolish to send up the slower flying "kites" to protect the swifter scout planes.

The French aviator was the man of the hour in French aviation. Only five months before he had established a world's long distance record by his nonstop flight from Villacoublay to Pomerania, covering 608 miles in the amazing flying time of five hours. Gilbert knew things and had dreams for military aircraft that the generals of the French air force could not appreciate. Gilbert had avowed that he would prove that his theory was right. It wasn't an act of bravado that had caused him to paint the name the escadrille had given him—

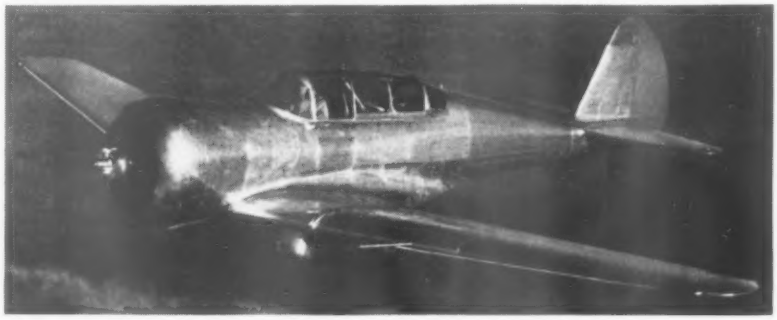
(*Continued on page 76*)

There's Nothing New . . .

WE thought—and so did the highly original Mike Murphy until he saw this—that Mike had thought up a really new one to be presented at the 1939 National Air Races at Cleveland. But the fact that we ran the picture of Mike's contraption (directly above) in our November, 1939, issue brought a letter—and the photograph at the left—from a sharp-eyed reader. Murphy "invented" the upside-down airplane out of the left-over parts of a couple of *Cubs*. He takes off and lands in either position. But the photograph at left proves that it was done long before Mike was thinking up stunt ideas for airplanes. The French airman, Civeer, built the odd plane in 1914 and flew it in both positions at a demonstration flight at Leipzig. Civeer's ship had a four-cylinder engine and swivelling tail wheel(s).

The New Curtiss "Falcon"

THE photograph below is of the first of a large number of Curtiss *Falcon* advanced trainers ordered by a foreign government, reliably reported to be Turkey. According to Curtiss-Wright officials, the new *Falcon* was designed specifically for the training of fighting pilots. It is powered with a 420 h.p. Wright *Whirlwind* engine which is fitted with a controllable-pitch propeller. Top speed is 215 m.p.h., while it cruises at 195; cruising range is 518 miles. Service ceiling is 25,900 feet. Both cockpits contain identical sets of instruments. The rear cockpit can be used either by a check pilot or by an observer-gunner. The *Falcon* is all metal and is equipped with retractable landing gear and sliding cockpit hatches. The center section of the cantilever wing contains tanks that hold a normal capacity of 68 gallons of gasoline. Split type, trailing edge flaps are standard equipment. Various forms of armament and bombardment equipment are included.



XUM

The author in the cockpit of the plane he flew in the accompanying article.

I Learned About FLYING From That!

No. 11

By Robert B. Rautenberg

This pilot neglected his maps, ignored much of his navigation—and had some experiences that taught him a lesson he'll never forget.

I'D like to submit this little item to your "I'm a Better Pilot Now," department. Confession may be good for the soul but it's hard on the self esteem. I'm getting this off my chest now before my own self esteem recovers from the beating it took—and while I'm still willing to tell the truth about what happened. All my troubles, I should say here, were the result of my own conceit developed when I was granted my private license.

It took something like this to jolt me out of the belief that you become an experienced pilot as soon as you are licensed. I made the mistake of thinking I could make a 550 mile cross-ountry flight without any previous cross-country experience and without even a careful study of the maps and course I expected to fly.

The surprising thing about it was that old NC-894N and I got away with a 275-mile flight from Curtiss airport, Chicago, to Lambert field, St. Louis. Of course we milled around until we identified the Chicago & Alton railroad tracks heading due south toward Springfield and simply followed them. After refueling at Springfield we headed west by south and as luck would have it—I now recognize that it was luck and not good pilotage—we did get to St. Louis.

We spent the night there and next day—without a thought of mistakes I could make—I merrily started home. I hadn't looked at a map, hadn't bothered to determine my return compass course and hadn't even checked the route to see what the first fixes should be. I was still so darned confident from the flight of the day before that I took off, made a hasty mental calculation of what my compass course should be and then settled down to fly by compass alone.

I didn't bother to look around, just slumped down in the cockpit. An hour went by. There was no sign of Springfield on the horizon. That gave me a funny feeling. All of a sudden my confidence evaporated. I felt all alone and exceedingly inexperienced. I hadn't the slightest idea of my whereabouts and I even began to wonder whether I was flying the airplane or the airplane was flying me.

I had to find out where I was. How to do it? Land. It was the only solution. Ten minutes passed and I saw a farm house beside a nice pasture. It was small but by slipping steeply I cleared a telephone line and got her in. A burly, unintelligent-looking gent was standing on the porch of the house. I cut the switch as he strolled over and climbed out to meet him.

"I'm lost," I explained. Then, figuring I might have overshot Springfield. I asked him: "How far am I from Bloomington?" He said: "I've never heard of Bloomington and that's the first airplane I ever saw."

I was dumbfounded. Never heard of Bloomington; where in hell was I? The farmer said he knew about where Springfield was, 150 miles to the north. Someone here seemed crazy—I was beginning to believe it was me. When I asked the names of the closest towns the farmer named a couple of which I'd never heard. I got out a map. He couldn't show me where I was. An older man arrived at the house and between the three of us we decided I'd flown southeast instead of northeast and had gotten off my maps. I was near Harrisburg, Ill., 140 miles southeast of St. Louis.

Meanwhile a crowd of farm folk had gathered around. They told me Harrisburg had an airport six miles away. I persuaded a man from the crowd—he'd never been up before—to come along and help me find the field. Just by a miracle I got out of that little pasture with the passenger aboard. We cleared the fence by inches. At 500 feet my passenger pointed out the airport—a good old Illinois corn field with two cinder runways. The hangar was boarded up because a flood had recently inundated the airport. There was no gasoline but I got 10 gallons of aviation fuel in town and poured it into the wing tank a quart at a time. I dropped my passenger back at the farm pasture and before taking off again asked him to point out the general direction of St. Louis—for I was without a map, having even forgotten to get a road map while after the gasoline.

Well I got into the air again and be-

(Continued on page 90)

Sixth Sense

WARD T. VAN ORMAN, world famous balloonist and frequent winner of the Gordon Bennett balloon race trophy, believes that his decisions, the quick snap decisions which he is frequently called upon to make in his flying career, are influenced by a sixth sense which he calls "the wee small voice."

In fact it is to the guidance of this voice that he attributes much of the success of his flying career.

In his diary, kept over a long period of years, since the very beginning of his flying career and which he has recently turned over to this writer for publication for the first time, he described instance after instance in which he was guided to safety by this "wee small voice", which others might call merely intuition, or perhaps divine guidance.

"The first time I remember feeling this almost uncanny guidance was at a moment when I was hanging outside a balloon basket, 500 feet above the ground, and felt my strength ebbing rapidly", he recalls. "Ordinarily it would have been a simple matter to have pulled myself into the balloon basket. But unfortunately my strength had been sadly depleted by a siege of typhoid fever.

"My arms seemed no longer able to bear the load of my body and cried for relief. 'A quick drop, a dull thud, and oblivion,' I thought, as I felt my numb fingers slipping.

"Then suddenly this wee small voice whispered 'Don't'. I looked up at the student pilot in the basket above me, thinking perhaps he had spoken. But his face was blanched with fear.

"'What shall I do?'" he yelled. "And through my teeth I hissed one word, 'Valve'. A minute later he jerked the valve rope, the valve opened and we slowly descended. I managed to cling to the basket to within two feet of the ground, then collapsed!"

The near tragedy had occurred in such a simple way that it seemed almost unbelieveable, Van explained afterwards. In training free-balloon pilots, it is necessary to give them a solo flight, in which they are sole operators of the craft.

During the war period, Van frequently terminated a flight with his students, by making a landing himself and replacing his weight, removed from the balloon basket, with sand or rocks, then sending the student on his way alone. On this particular day, Van had stepped out of the basket before sending the soloist aloft.

It is always a good policy to weigh-off the balloon to see whether it has an ascentional force. In this case, Van ordered "hands off" and the farmers who had been holding it, released their hold upon the basket, and it started up from the ground.

"Thinking of course the basket was

(*Continued on page* 89)

Al Williams' Latest

LATEST addition to Al Williams' fleet of Gulf airplanes is the Stinson "105" shown beside the famed Grumman usually flown by Williams. The new Stinson (known as *Gulfhawk Jr.*) brings the Gulf fleet to nine ships. *Gulfhawk Jr.* is to be flown by the noted pilot during much of his work among private flyers. The new little Stinson is a standard "105" powered with a 75 h.p. engine. It has a rated top speed, according to the manufacturer, of 115 m.p.h. and cruises at 105. Range is 420 miles. This performance has been somewhat improved with the announcement recently of the 1940 "105," powered with an 80 h.p. engine. This is basically the original ship with the addition of five horsepower being the major change. In sharp contrast to *Gulfhawk Jr.* are the two Grumman fighters flown by Williams. These are special models of the famed F3F fighters used by the U. S. Navy. They have a top speed of approximately 250 m.p.h. with a cruising range of nearly 800 miles. The two Grumman *Gulfhawks* are NR-1050 and NC-1051; the former is a single-place ship, the latter has been converted to a two-place job. NR-1050, built for Williams in 1936, is powered with an 815 h.p. Wright *Cyclone*. NC-1051 was built in 1938 and is powered with an 850 h.p. *Cyclone*. Williams still will use both for speedy business trips. Meanwhile, other members of the Gulf aviation division use standard four-place Stinson *Reliants*. The company last was reported to have six of these ships. They are all based at Pittsburgh.

Carrier Landing Practice

THE photograph below is of unusual interest in several respects. It is an excellent action picture of a Curtiss SBC-4 at the instant of touching down during carrier-landing practice at the Naval air base at Oakland, Cal. The ship's tail wheel has just touched between two of the white flags that mark off the theoretical deck of a carrier. Notice that the tail wheel is on the ground although the front wheels are not. The position of the pilot at the instant of landing also is interesting. The SBC-4 is the standard Navy scout-bomber and is powered with a 1,000 h.p. Wright *Cyclone*. The Navy purchased 58 SBC-4's in its first order for that type, to augment its 83 SBC-3's. Many SBC-4's are being assigned to Naval Reserve aviation bases as well as the fleet. Not shown in the picture below is the retractable landing hook at the plane's tail which picks up the arresting gear on the deck of a carrier. The SBC-4 has flaps, retractable gear and a rated speed of about 250 m.p.h.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

By GILL ROBB WILSON

THE Aircraft Owners and Pilots Association wishes to felicitate the Institute of Aeronautical Sciences and to congratulate James H. ("Jimmie') Doolittle on his elevation to the presidency. Jim is typical of a group which came into aviation through the military channels and the World War. There were no aeronuatical engineering courses available to them. They had to learn the hard way, the way of trial and error. A few were content to let it go at that and soon drifted out of aviation. A small regiment of fellows like Jim Doolittle, Al Williams, Casey Jones and perhaps a hundred others dug in to learn what it was all about. To pilot ability they added an academic foundation which has given them a permanent place in the history of American aviation. These men have been distinguished for their flying technique and engineering or business ability. The common denominator of them all has been an unquenchable faith. Each of them has put in more than he has taken out. Whether in civil or military aviation development, the nation holds its aviation position today because of the devotion of such men. It is a fact that Don Douglas and Doctor Hunsaker and Benny Howard and the whole kit and kaboodle of them, from professors to barnstormers, are fundamentally idealists and great Americans. That they happen to be great aviators is also lucky for the country.

More power to you, Jim, in your year as president of the Institute. With the undying Lester Gardner to ease the way, you will be "contact" most of the time.

It's a Big Sky

Sometimes we stand and look up and wonder why in thunder all the fuss about air traffic. There is so much room upstairs. And then we realize that what complicates the picture is the fact that we try to bring everything that flys, regardless of its speed or size or purpose, into one little spot on the ground. That is where air traffic begins.

In the final analysis the answer must be an almost direct-lift aircraft which does not need an airport. This is particularly true of non-scheduled air transportation.

The use of private aircraft is keeping pace with the growth of scheduled transportation. If we are going to avoid a welter of air traffic regulation, our engineers had better be quick about this direct-lift airplane. Nothing will stop private aircraft development quicker than the creation of a traffic situation. Unless it is avoided there will be inevitable conflict between scheduled and non-scheduled flying and inevitable collision by the undirected and unregulated aircraft.

Already such conflict becomes apparent as in the North Beach situation. Such situations will never be solved by calling each other names, for there is reason to both sides of this traffic problem. The way to meet it is the creation of facilities affording a proper segregation of various flight classifications; or "getting to the root of the matter" through the creation of aircraft which can use comparatively small and unprepared areas for landing and take-off. We don't want to see the pendulum swing backward because progress has created enough aircraft to bring traffic confusion. If the vastness of the sky as a highway is going to mean anything to us we must find some way to use it without everyone using the same 50 feet of land surface.

Fleas on the Dog

The AOPA learned of plans to assess a fee against private owners who base at one of our biggest and best airports. This fee is proposed in addition to the regular storage and service charges.

The idea behind it is that the community furnishes an airport and the private owner who uses it should help to pay for it. The fallacy in this theory is, of course, that the private owner is already doing his part. He has paid heavy taxes on the equipment he purchased; he pays a heavy tax on the gasoline he burns, personal tax on his aircraft and a substantial contribution to the progress of a new industry and the national security in his general activity. Why should he be taxed simply because he owns an airplane any more than a man should be taxed because he owns a washing machine? The fee is not vital, but the principle is.

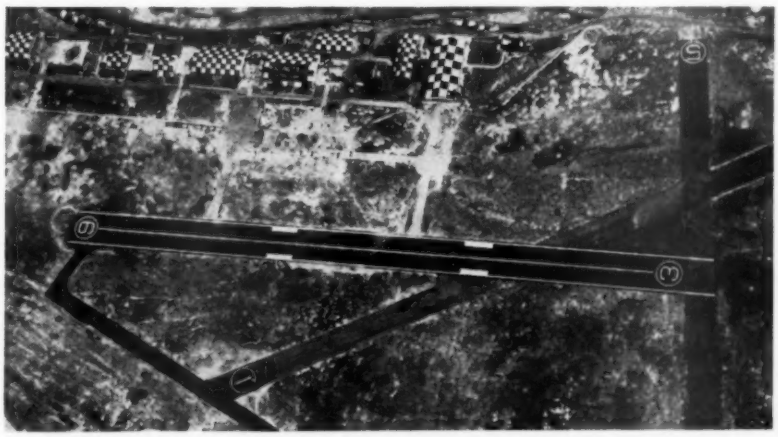
Many civil aircraft used in non-scheduled operation are owned by fixed-base operators. It has been a definite struggle to boost the individual market. We are getting that market under way and the manufacturer sees a definite possibility in it. Now, someone wants to come along and put up a very practical nuisance barrier across the very road we have had the most difficulty in building.

The AOPA has made the strongest possible plea against such a development. Municipal officials, for a paltry few hundred dollars, might very easily wreck the progress of an industry worth millions in tangible values and billions in intangibles. The AOPA sympathizes with the financial problems of the municipality regarding airport development. However, with a wealth of experience at our command, we respectfully ask municipal officials to consider the general picture before taking local action.

Ho, Hum!!

Every now and then somebody writes us a letter blistering the CAA or some particular state official and goes to great lengths to "cuss out" all official supervision of aviation. We don't carry the torch for anyone, but we do know of aviation regulation in most other countries. The American pilot who thinks that he is regulated just ought to look over some of these other set-ups.

There is an occasional ruling that is unnecessary. There is an occasional official or inspector who forgets that he is a servant of aviation and thinks that he is a boss. No system is perfect, but, all in all, American aviation has as few screwball ideas and officials as you will find anywhere. It is mighty easy to get the idea that because you represent the federal government you are somebody! It is mighty easy to get that idea knocked out of your head if you find out just what people think. *If any of you fellows are victims of a bum piece of regulation or a fresh inspector, give us the dope.* The AOPA will go to bat! In the meantime, don't forget that old Uncle Sam is a pretty swell guy. The average govern-



Numbered runways similar to those at the Anacostia Naval Air Station (above) are advocated by AOPA officials. These eliminate a great deal of traffic confusion.

ment or state official is trying to do a good job and in thousands of cases shuts his eyes instead of his fists because he thinks we pilots are pretty good eggs and perhaps go a little haywire now and then just because we are full of vinegar.

Nice Going, Mr. Williams!

The Aircraft Owners and Pilots Association wants to congratulate Al Williams and the company he represents. While some of his business competitors discounted the possibility of non-scheduled aviation as a fuel market, Al went directly the other way and put on the heat. He advertises directly to the private consumer and pitches in on such private flying ventures as the annual winter trek to Florida. He does an altogether good job! Any corporation which tacitly states, through lack of interest or surrender of interest, that the private flying market will never amount to anything is blind.

Al Williams

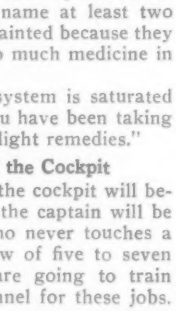
Take a Tip!

Gill Wilson, our executive consultant, writes: "I have just had the flu and have been stuffed with quinine and pills of various and sundry sorts. The flu is gone but I will stay out of an airplane for at least a week. I can name at least two pilots who, I believe, fainted because they started to fly with too much medicine in their systems."

"Don't fly if your system is saturated with drugs, even if you have been taking only cold tablets and light remedies."

The Passing of the Cockpit

Within this decade the cockpit will become a bridge where the captain will be a 60-year-old pilot who never touches a control but has a crew of five to seven men. The air lines are going to train their own pilot personnel for these jobs. They will have to start with young fellows who have an educational background. If you are going to be a professional aviator of the future, you had better begin to educate yourself. Mr. W. A. Patterson who runs United Air Lines once said that he had averaged three nights a week at night school for more than ten years. That is why he is president of United Air Lines instead of an accountant. It doesn't matter what job you want in aviation, you will have to be the cream of the crop. A strong back and a weak head have no place on the frontiers of the skies.



W. A. Patterson

Sleep in Bed

A great temptation in flying light aircraft is that of falling into the habit of simply drifting around. We find too little of flight planning, too little pre-determined altitude, compass bearing and timing. We will never maintain a fine pilot technique that way. Of course you can fly an airplane just as you go out to ski or to skate and it is lots of fun. That is all it is!

The other day we helped place a lad who had never flown anything but a Taylor Cub. He had 1200 hours in it but he had flown that Cub intelligently. He had an instrument rating in it. He had practiced precision flying and cross-country work. Actually, he stepped out of that Cub into a DC-3 and didn't do a bad job at all. He is now riding the right-hand seat and he will be an air line pilot when the line finishes his training. You can learn on the little ships if you tackle them with that idea in mind.

Airport Regulation

The CAA has been sniffing around to ascertain what folks would think about uniform regulation. In the first place, the CAA can't do anything about airport regulations unless the airport is used in interstate commerce. In the second place, the CAA can't enforce airport regulations because they have nothing but a skeleton staff.

It is sound to have certain practices about the airport. The full use of the runway, chocks in front of an airplane being started, a competent individual in the cockpit at all times when an engine is running, a straightaway climb to a minimum altitude, no cutting across an airport while in flight, a straight flight path of at least 500 feet in landing, all traffic circling in one direction, etc.,—these things are practical and simple. They should be uniform, but the CAA cannot do much about them. They are a matter of pilot education and of discipline enforceable only by airport management. State and municipal authorities can do a better job in this situation than the CAA. The insurance companies can also make a contribution in refusing to insure aircraft at a field that lacks intelligent management. If we can use education instead of law we should do it! If internal discipline will serve the purpose, we should not call external discipline into the picture.

The Ides of March

The approach of spring will find more than 4,000 pilots in the membership of the Aircraft Owners and Pilots Association. There is power in that number! For the first time in the history of American flying, miscellaneous aviation is meeting the challenge to organize. Never a day goes by but that I receive letters from various leaders of the industry as well as from its newest students. The spirit of unity and cooperation is thoroughly heartening. The AOPA is trying to accomplish, in a sound and businesslike way, all that should be done to clear the way for the development of miscellaneous aviation. The AOPA is not cluttered up with pilots who wonder what they can get out of it, but rather what they can put into it. Flying men and women have discovered that there is no Ethiopian in the woodpile and that the AOPA is just what it claims to be, a professional service for the development of non-scheduled aviation.

END

On Byrd Expedition

CONTINUING his policy of using airplanes on his expeditions to the Arctic and Antarctic, Adm. Richard E. Byrd has taken two planes with him on his latest (fifth) journey to the Antarctic. On this trip he has taken the twin-engined Barkley-Grow seaplane shown above and a single-engined Beechcraft. The Barkley-Grow has been named *The Explorer*. This ship is that company's standard T8P1 seaplane and is powered with two 450 h.p. engines. *The Explorer*, which will be used to map the shore line of Antarctica, has a maximum cruising range of 920 miles. That is with 220 gallons of fuel; carrying the standard 160 gallons, the ship's range is 670 miles. Top speed at 5,000 ft. is 191 m.p.h. while the cruising speed at the same altitude is 172 m.p.h. As a landplane, this ship's top speed at the same altitude is 224 m.p.h. and it cruises at 216 m.p.h. Outstanding feature of the Barkley-Grow is its patented, multi-spar stressed-skin wing structure which uses no ribs or bulkheads. Its structure consists of a series of longitudinal webs of formed and lightened sheet metal to which the top and bottom sheet metal coverings are attached. As a transport, the T8P1 carries two pilots, six passengers and 295 lbs. of baggage and cargo. Weight empty is 6,480 lbs.; gross weight is 9,200 lbs.

VERTICAL TAIL AREA DESIGN

by RAOUL J. HOFFMAN

THE vertical tail is the unit of the control surfaces that gives an airplane directional stability. An airplane is directional stable if an increase of the angle of yaw (Section 1) introduces forces that will return the plane to its original position. Generally, separate vertical surfaces are used. However, in tailless airplanes or planes having rotary wings—such as autogiros or helicopters—other devices may be necessary.

The estimation of the vertical tail area presents a complex problem. So many factors are involved in the directional stability that, in the early stages of airplane designing, none of the theoretical formulas could be satisfactorily applied.

It is universally accepted that an airplane will rotate about its center of balance or its center of gravity (c.g) if an uneven airflow causes an angular displacement. This axis is the so-called "Z axis" used in all stability investigations. However, the simplest method is to assume that, in similar designs, the vertical tail area to be a certain percentage of the wing area. Section 2 gives the ratios used at various times. A separate fin area indicates that the seaplane was originally designed to be a landplane. The added fin is to overcome the unbalanced portion of the floats.

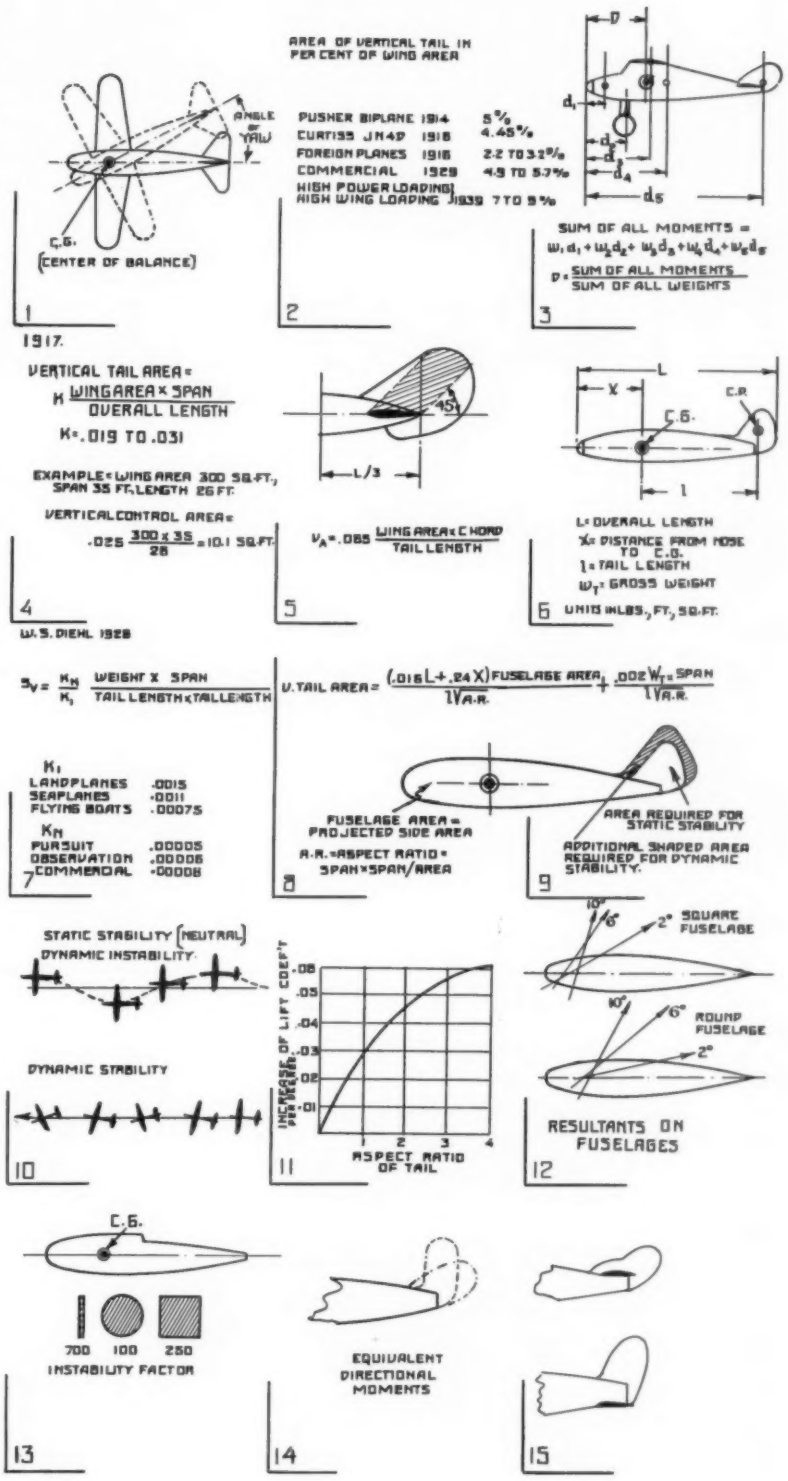
Section 1 illustrates the yawing motion of the plane about its c.g. and Section 3 gives the methods of moments to find the center of balance. The distance of the c.g. from a datum line is the sum of all moments about that line divided by all weights taken into consideration.

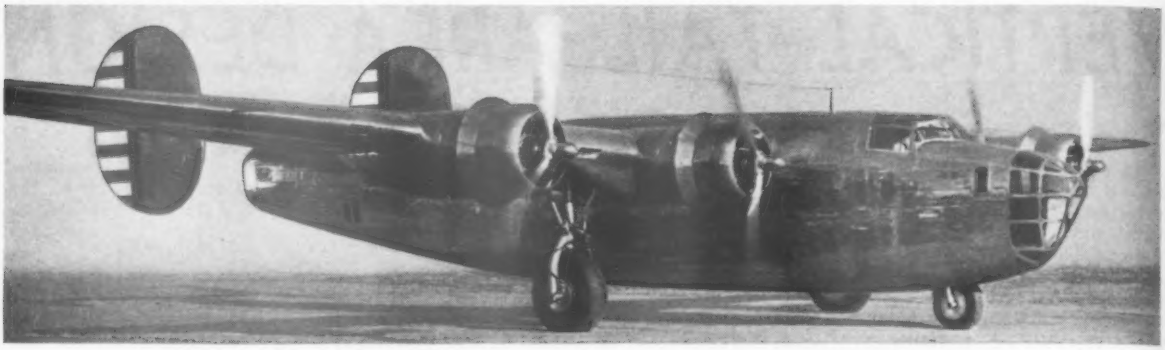
In the following, various methods and formulas will be given which also are indicative of the advancement made toward a closer estimate of the size of the vertical tail area. The formula in Section 4 uses the overall length of the plane, the span, wing area and a constant, ranging from .019 to .031. The equation in Section 5 shows the tail area to be the rudder area, minus the shaded portion of the rudder, plus one-third of the fuselage side area. The assumption is that the vertical tail is shielded by a 45° projection of the horizontal tail. This equation takes the tail length as a variable, which is the distance of the center of pressure of the vertical tail or the rudder post to the c.g. of the airplane.

Various notations used in the formulas are sketched in Section 6.

A formula developed by W. S. Diehl (shown in Section 7) has many constants that may give too uncertain tail area. Another formula simplified from the latest Diehl equation is noted in Sections 8 and 9. This formula is composed of two parts. The first part calculates the necessary rudder area required to neutralize instability tendencies of the component units. The second figures the additional area required to make the plane actually stable. The first part

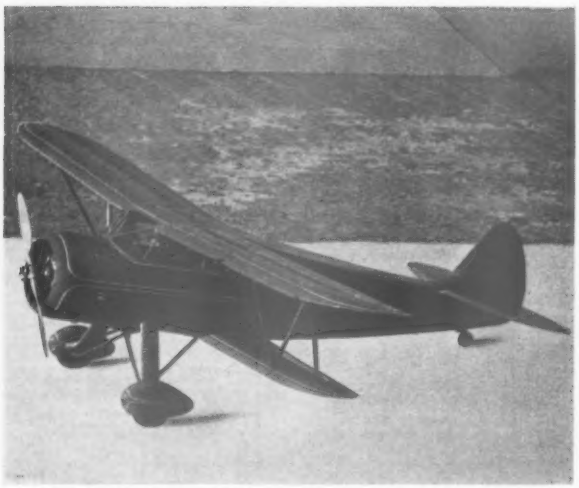
(*Continued on page* 68)


ANGLE OF YAW
C.G. (CENTER OF BALANCE)
1
AREA OF VERTICAL TAIL IN PER CENT OF WING AREA
PUSHER BIPLANE 1914 5%
CURTISS JN4D 1918 4.45%
FOREIGN PLANES 1918 2.2 TO 3.2%
COMMERCIAL 1928 4.9 TO 5.7%
HIGH POWER LOADING
HIGH WING LOADING 1939 7 TO 9%
2
SUM OF ALL MOMENTS = w1d1 + w2d2 + w3d3 + w4d4 + w5d5
p = SUM OF ALL MOMENTS / SUM OF ALL WEIGHTS
3
1917.
VERTICAL TAIL AREA = K WING AREA x SPAN / OVERALL LENGTH
K = .019 TO .031
EXAMPLE = WING AREA 300 SQ.FT., SPAN 35 FT, LENGTH 26 FT.
VERTICAL CONTROL AREA = .025 (300 x 35)/26 = 10.1 SQ.FT.
4
45°
L/3
V_A = .085 WING AREA x C HORD / TAIL LENGTH
5
L = OVERALL LENGTH
X = DISTANCE FROM NOSE TO C.G.
l = TAIL LENGTH
W_T = GROSS WEIGHT
UNITS IN LBS., FT., SQ.FT.
6
W. S. DIEHL 1928
$S_V = \frac{K_N}{K_1} \frac{\text{WEIGHT} \times \text{SPAN}}{\text{TAIL LENGTH} \times \text{TAIL LENGTH}}$
K_1
LANDPLANES .0015
SEAPLANES .0011
FLYING BOATS .00075
K_N
PURSUIT .00005
OBSERVATION .00006
COMMERCIAL .00008
7
V. TAIL AREA = (.016L + .24X) FUSELAGE AREA / 1 V A.R. + .002 W_T = SPAN / 1 V A.R.
FUSELAGE AREA = PROJECTED SIDE AREA
A.R. = ASPECT RATIO = SPAN x SPAN / AREA
8
AREA REQUIRED FOR STATIC STABILITY
ADDITIONAL SHAPED AREA REQUIRED FOR DYNAMIC STABILITY.
9
STATIC STABILITY (NEUTRAL)
DYNAMIC INSTABILITY
DYNAMIC STABILITY
10
INCREASE OF LIFT COEFF
.08
.05
.04
.03
.02
.01
1 2 3 4
ASPECT RATIO OF TAIL
11
10° 2° SQUARE FUSELAGE
10° 6° 2° ROUND FUSELAGE
RESULTANTS ON FUSELAGES
12
C.G.
700 100 250
INSTABILITY FACTOR
13
EQUIVALENT DIRECTIONAL MOMENTS
14
15

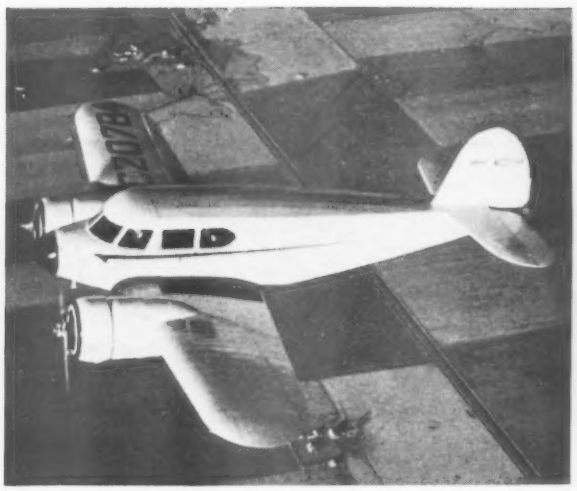


Above is first exclusive photograph of four-engined Consolidated B-24 bomber for the U. S. Army Air Corps. The wing is the secret new airfoil first installed on the Consolidated Model 31 flying boat.

HAVE YOU SEEN ?

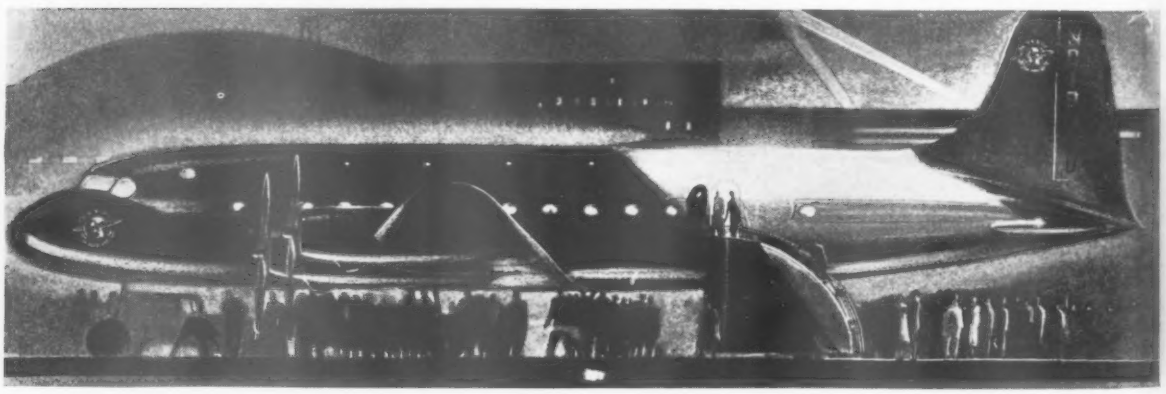


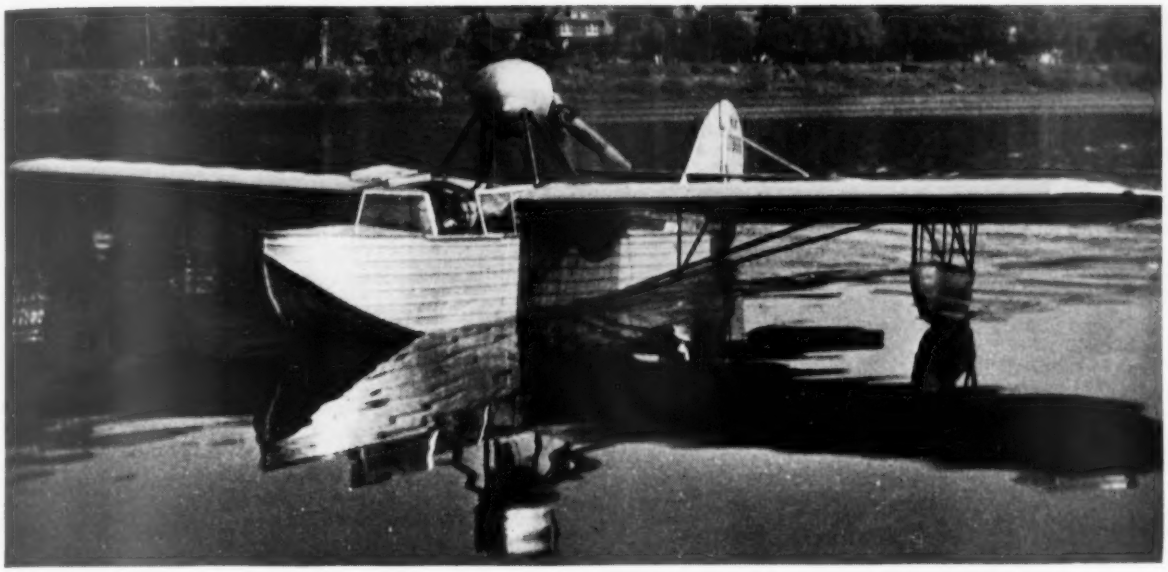
Latest Waco is this plywood-winged Model E. Its Jacobs engine gives it a cruising speed of 177 m.p.h. Model E is five place.



Cessna's new T-50 has two 225 h.p. engines, cruising speed of 191 m.p.h. and seats five. Maximum range is 1,000 miles.

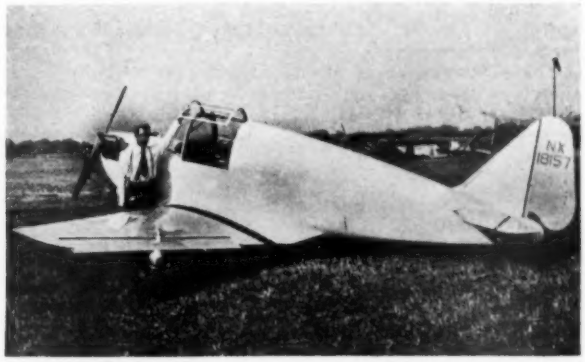
Picture below is Douglas' catalog drawing of its revised version of the DC-4. Four American airlines have ordered 39 of this model. It will carry 42 passengers, cruise at 227 m.p.h., cost $350,000.





Soon to go on the market is this two-place 75 h.p. Piper "Cub Clipper" amphibian designed by Ray Applegate. Top speed is 98 m.p.h., cruising 85. Hull is non-corrosive metal. Price will be about $2,500.

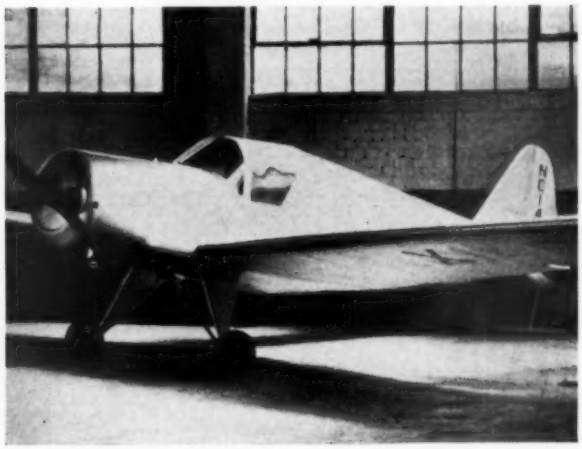
Dart Model L has retractable landing gear, 75 h.p. engine, two seats, is said to cruise at 130 m.p.h. Price: about $2,200.



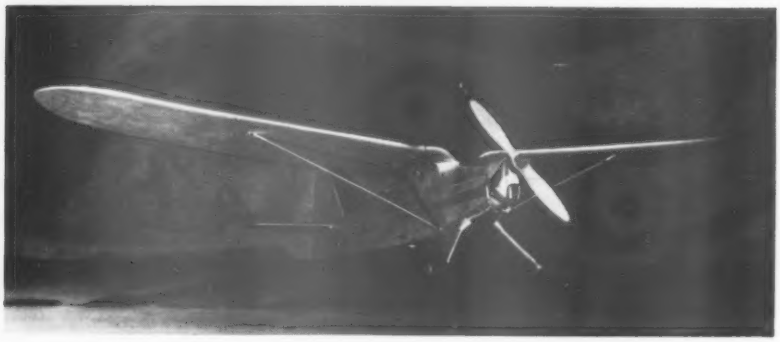
Powered with a 60 h.p. engine, this new Jensen lightplane is reported to cruise at 110. Company is at Charleston, S. C.

Latest addition to the Piper line is this three-place, 75 h.p. "Cub Cruiser". Speed is 110, range 320 miles, weight 750 lbs.

Also expected to enter the lightplane field is this Johansen JA-2 now undergoing tests in California. Engine is 40 h.p.



XUM



The finished model at left is a particularly "clean" job and an admirable flyer.

BUILD THE 'GULL WING'

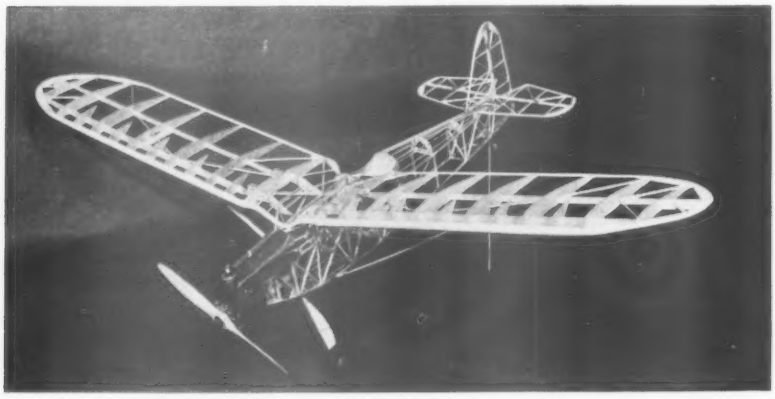
by PAUL W. LINDBERG

Model Editor and Designer

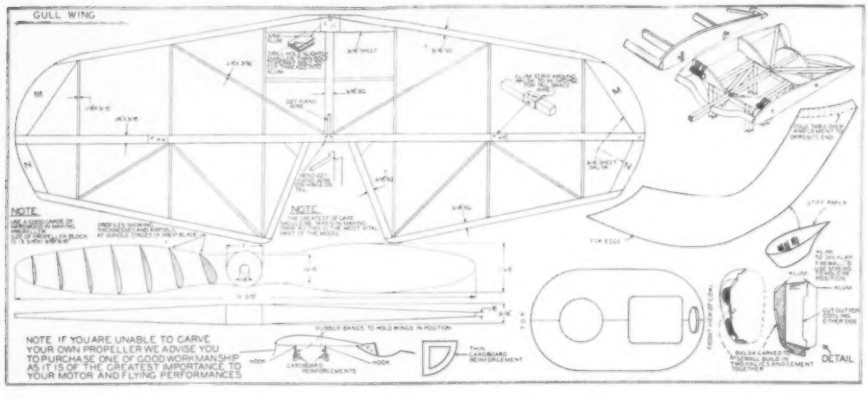
THIS month's article deals with the building of a gas model that has been put through extensive flight tests. Many late features have been built into this model, such as removable wing panels for ease of carrying, as well as for preventing damage to wings in case of an accident.

The landing gear is of the rugged cantilever type. All tail surfaces are adjustable. Ailerons may be built into the wings if desired, although these are not necessary and the trimming tab made from aluminum approximately 1 x 4 inches will serve the purpose. The builder will find this model extremely simple to construct.

Any "D" class motor is suitable. However, it will also operate on certain "B" class motors.



The two body sides of the fuselage should be constructed first, followed by the fire wall and the gulled center section. Below are plans for tail and propeller.


GULL WING
NOTE
NOTE
NOTE IF YOU ARE UNABLE TO CARVE YOUR OWN PROPELLER WE ADVISE YOU TO PURCHASE ONE OF GOOD WORKMANSHIP AS IT IS OF THE GREATEST IMPORTANCE TO YOUR MOTOR AND FLYING PERFORMANCES
DETAIL

By increasing the plan five times the size shown on the opposite page, the model will be the same size as the one we have constructed. To increase to the size desired, all that is necessary is to use an ordinary pair of dividers and lay your plans out on paper or boards.

In constructing the model it is advisable to begin with the fuselage. Correct sizes are shown on the plan. Build the two body sides first and, after they have been completed, remove from the surface on which they were constructed and cement in all horizontal members. Pins or tiny brads may be used to aid in the construction. The formers next are cemented into position after having been cut to size.

The fire wall is made from three-ply veneer, ⅛ inch in thickness. Next apply stringers over the top of fuselage. The gull section of the wing now is built into the fuselage. This will require a little time, as reinforcements must be added for strength. See that all joints are properly cemented.

The landing gear is made from piano wire ⅛ inch in diameter, front part only. The rear is 1/16 inch piano wire. These are thoroughly tied in with heavy thread and cemented. Adding the balsa fillet is optional, although we believe it adds much to the ship's appearance. If the fillet is added, wrap over wire and balsa with bamboo paper strips for strength, using a coat of dope between each wrapping.

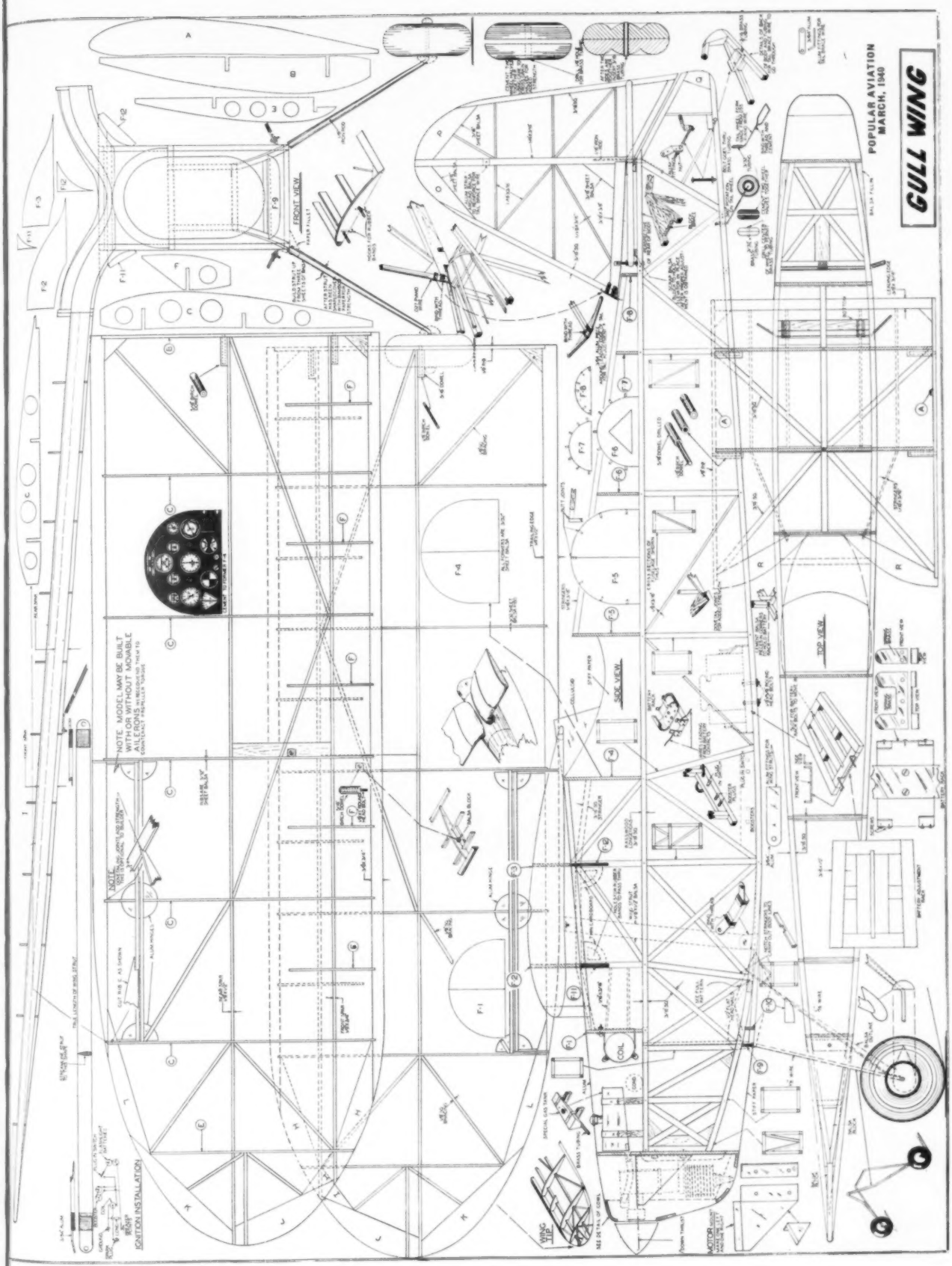
Rubber or balsawood wheels may be used, three or 3½ inches in diameter. The motor cowl is built up from sections of balsa. Hollow these out so as to make as light as possible. As the cowl is mostly for display purposes, it is not absolutely necessary to cut the correct opening for cooling; although, if made as shown on the plan, the motor will cool properly. The motor mount, gas tank, installation of coil, etc., are clearly shown on plan. Study these carefully and you will find very little trouble in their construction.

The wings also are built upon a flat surface to prevent warping. In building the wings, it is necessary that you cement in all bracing as shown on plan so as to gain the required strength. Note that ribs B and B are a full ⅛ inch thick so as to prevent the paper from buckling these ribs.

The tail surfaces are particularly simple to build. They both are of the flat section type and all tips are made from 3/16 inch sheet balsa. This type of tip is much easier to construct and causes less difficulty when repairing.

Covering the model is considered by some model builders to be the most difficult operation, but if gone about

(*Continued on page 86*)


GULL WING
POPULAR AVIATION
MARCH, 1940
FRONT VIEW
SIDE VIEW
TOP VIEW
NOTE: MODEL MAY BE BUILT WITH OR WITHOUT MOVABLE AILERONS
IGNITION INSTALLATION
COIL
WING TIP
MOTOR

What's At The Front?

(*Continued from page* 11)

stands to reason, however, that metal takes weather better than cloth.

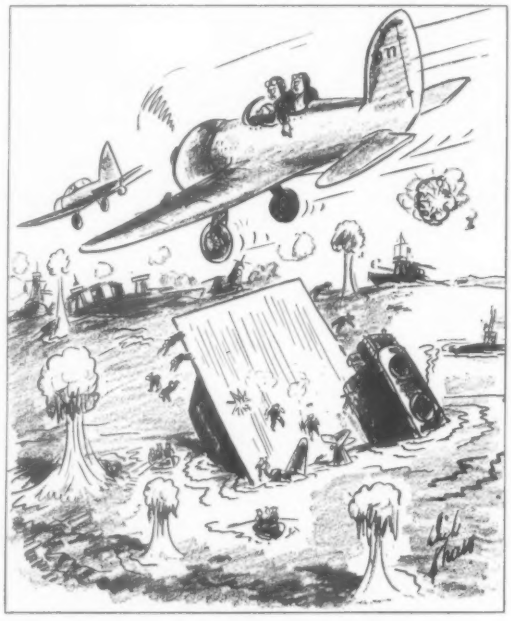
The *Hurricane* is eight-gunned like the *Spitfire*. R. A. F. mechanics have an ingenious trick they perform with the guns. Each time a fighter returns from business aloft, doped fabric is fastened over the wing gun ports. The fabric is removed by the first bullets the next time the ship goes up. The trick not only keeps rust out of gun barrels, but improves take-off and initial performance slightly by closing the holes.

France's Morane is the only 100 per cent metal fighter in the show. An 860 h.p. Hispano-Suiza 12 cylinder engine with the famous H-S *moteur canon* between the cylinder banks and firing through the propeller hub, provides power enough for about 310 m.p.h. The Morane is also a low-wing monoplane and has the widest landing gear of any of the fighters. The French must know their own mud. The wide tread is a big help on the muddy airdromes in eastern France. Though the Morane is the slowest fighter on the Allied side the French pilots, who are showing themselves to be the best in the war, have made good use of the fact that its shell gun is the only one in actual use on the front and outranges machine guns. They are choosing their targets, staying outside the range of the target's own guns and popping into the target at leisure numbers of the five dozen 20 mm. shells the Morane carries. Not many hits are needed, either. One pilot hit a Messerschmitt Me-109 right in the gas tank with one shell a few weeks ago, just aft of the cockpit. There was a cloud of smoke and a trail of tiny pieces fluttering down through the sky—that was all. The Me-109 had simply been disintegrated.

Willi Messerschmitt's Me-109 has appeared in several forms. First there was the version powered with a 12-cylinder inline Junkers "210" engine, developing about 600 h.p. Its top speed was 311 m.p.h. This is the plane that made its first appearance in the Spanish Civil War. Later the Daimler-Benz "600" engine (1,050 h.p.) was substituted and other changes were made. The result was a somewhat faster ship—the one now on the front. It has four .312 inch machine guns, one in each wing and two in troughs atop the engine cowling, firing in between the propeller blades. The latest Me-109 has the still more powerful DB-601 engine (same basic design as the "600", but rated at 1,150-1,350 horsepower) and a 20 mm. shell gun firing through the propeller hub beside the machine guns. It is the one for which the Nazis claim 354 m.p.h. It is being kept in Germany for anti-bomber defense, as testified by shell holes in the wings of a British *Blenheim* that recently carried out a mission over Germany.

All of the Messerschmitts are noted for their ready maneuverability and the ease with which they can be handled—once you know how to fly them. If you do not, however, watch out. The only one the Allies are liable to capture in flyable condition for a long time was washed out a few weeks ago on its first Allied "test flight" by a French pilot unfamiliar with slots and flaps. So the Allies still know little of the plane first hand.

The Me-109 probably is the easiest plane to build of all the fighters in World War II. It was designed with factory necessities in mind. For example, instead of the conventional wing attachment to fuselage, the wing is fastened at the front end by means of pins on a frame which also takes the landing gear leg and the rear of the motor mounting. Each half of the wing is attached at only three points. The arrangement is simpler than that found in any of its rivals. The Me-109 has a distinctive straight tapered, rectangular tipped wing. Its loaded weight is only 5,500 pounds and its span is 32 feet six inches. Unique among World War II fighters, the entire tail unit can be moved up or down. The cockpit cover, also alone among its contemporaries, is hinged instead of being on a track. The pilot has a mirror and excellent rear vision even without it.



"Y'never could depend on that outfit of ours . . . now where do we go? . . ."

Little has been heard of the Heinkel He-112, which the Nazis may not be using because it is too tough to fly and which the engineers may be wrestling with to improve its handling characteristics without sacrificing too much performance. When fitted with the same engine as the Me-109, it is slightly faster—317 m.p.h. for the Junkers "210"-powered version, and 358 m.p.h. for the model with the DB-601. Aerodynamically, the fish-like Heinkel is rated by Allied engineers one of the most perfect ships ever built. The He-112 is also a low-wing monoplane with the elliptical wing which marks every modern Heinkel craft. The most recent version's armament consists of two 20 mm. shell guns, one in each wing outside the propeller disc, and two .312 machine guns in troughs atop the engine cowling, as in the Messerschmitt. The He-112 is slightly heavier than the Me-109. All the fighters, unless specially adapted for bomber escort by putting in wing tanks, can cruise for an hour and a half.

So much for the fighters in service. France has a whole flock of types coming along, including a Bloch "152" with a French radial engine (Gnome-Rhone 1,030 h.p.) which looks very much like the P-36 but is a little faster. There are others. But they are not in the war yet.

Cream of the bomber class is the long-nosed Bristol *Blenheim*, good for 295 m.p.h. around 15,000 feet. One would probably think twice in the United States before calling this a "medium bomber" as the British do, because of its small size and weight: span 56 ft. 4 in. and weight just over six tons fully loaded, as compared with nearly 80 feet and 12 tons for our Douglas B-18. But there you are, a medium bomber it is. It is faster than any other bomber in service in sizable numbers. The number of *Blenheims* floating around is truly tremendous (figures taboo).

The *Blenheim*, a midwing monoplane, has two Bristol *Mercury* engines—nine-cylinder air-cooled radials rated at 725 h.p. for take-off, more at higher altitudes in the short-nosed version, more powerful in the newer *Blenheim*. Bristol is the firm which has just developed the sleeve-valve engine. The *Blenheim*, like all the other bombers except for the very heaviest four-engined jobs (which have made no war appearance yet and are not likely to for a long time to come, as they are all too slow), is being used for long distance scouting flights. As a bomber, its load is in the neighborhood of 1,500 pounds and it has a radius of action of just over 500 miles. Three men are in the crew. The earlier short-nosed *Blenheim* is rather lightly armed, having only one forward-firing machine gun in the port wing and a rearward-firing gun in one of those power-operated turrets.

That British turret appears to be better than the simpler turrets fitted to German bombers and gives the gunner a very large field of fire. It has one drawback, however, due to the fact that it is usually placed pretty far aft—all the way in the tail sometimes, as in the Vickers *Wellington* and Armstrong-Whitworth *Whitley* bombers. The gunner gets it in the neck far more often than anyone else in the plane—casualty lists published so far show

(*Continued on page* 66)

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(*Continued from page 64*)

that. And he has the hardest time getting out in case the plane meets its end. German bombers which first came out with the simpler and less efficient German turret also mounted well to the rear have since been modified to place the turrets just behind the pilot, either above the fuselage or below it or both. The field of fire is somewhat restricted and the plane's streamlining is more seriously affected, but the gunner has a better chance. While one is comparing gun mountings, by the way, the power-driven turret appears to give a better field of fire and to allow more guns to be handled than is possible with the blisters with which American designers like to decorate their bombers.

Except for the Fairey *Battle*, other British bombers are larger than the *Blenheim* as well as slower. (*Sentence deleted by censor.*) The *Battle* is the R. A. F. general purpose plane in France. It is to be used for attack aviation, bombing, dive bombing and scouting. It can go as fast as 265 m.p.h. at altitudes around 15,000 feet. The Vickers *Wellington*, which spans 86 feet, has a top speed of about 255 m.p.h. and, because it is built on the Vickers-developed lightweight "geodetic construction" principle, it has exceptional range and load-carrying ability. Another important British bomber is the Armstrong-Whitworth *Whitley*, also two engines (Siddeley *Tiger VIII* 14-cylinder radials rated around 800 h.p. at altitude, or *Merlins*), 12 tons gross weight, 245 m.p.h. in its fastest service form and with its square nose quite as ugly as the original Douglas B-18. Still another is the twin-engined Handley Page *Hampden*, which is a little larger than the *Blenheim* (*remainder of sentence deleted by censor*). The last version on which details are available does about 245 m.p.h., has its crew of four and all the works crowded into the front third of the fuselage, the remaining two-thirds being little more than a tail boom. (*Part of paragraph deleted by censor.*) The *Hampden* is the only important British service bomber whose aft gunner is not housed in a turret just forward of the tail or at the very tip of the fuselage.

France's modern heavy and medium twin-engined bombers count three fast types—the Amiot "370", the Bloch "131" and the Lioré et Olivier (LeO) "45". The LeO, an 11-ton low-wing monoplane with a pair of 1,100 h.p. Hispano-Suiza radials, has been in production since last spring, though none have yet been in an actual engagement. It tops 310 m.p.h. The Amiot "370" is the latest of a trio of Amiot bombers of roughly similar type. Fitted with Hispano-Suiza in-line engines, it does about 340 m.p.h., which is not bad for a nine-ton bomber. The Bloch "131" is the slowest; its best is about 265 m.p.h. The lull in the war, by the way, has been a help to France in one respect: it has enabled the French Armée de l'Air to relegate the old "two story front end" Amiot "143M" to training purposes while quantities of the newer ships are turned out of training factories.

Germany has showed the Dornier Do-17 and its big-nosed offspring and the Heinkel He-111K among its bombers. The twin-engined Junkers Ju-86K, which attracted first notice in Spain, hasn't been in action at all and may be considered obsolete. As in other directions, however, Germany is not showing her best bomber—the Junkers Ju-88. The wildest speculation is now running riot among Allied air people as to what it's like. Everyone knows it is good; it set up speed records of more than 320 m.p.h. over long distances with heavy loads last spring. The Junkers factory at Dessau has been busy turning them out since the beginning of this year. Only one photo of the Ju-88 has ever gotten out of Germany, so far as is known. That was a picture of it taking off from the Junkers airport and was made with a Leica by a lucky Englishman—lucky because he was not caught. Unfortunately, the photo is pretty small and, even when enlarged, it does not show very much. The Ju-88 has the new *Jumo 211* 1,200 h.p. 12-cylinder in-line engines.

"Wonder if Joe remembered to bring back a new pair of pajamas for the boss . . ."

There are Dornier Do-17s and Dornier Do-17s, ranging from the first one fitted with the old B.M.W. VI in-line engine—almost the only large in-line engine in the world which makes for poorer streamlining than most radials. Its upright cylinders leave a hump which gets neatly in the way. With those engines, the Do-17 does only 235 m.p.h. But Bramo Fafnir and B.M.W. 132 Dc (Pratt and Whitney *Hornets* built under license by the Bayrische Motor Werke) improve the "flying pencil" a lot and when it has a pair of Daimler-Benz "600" engines, the Do-17 has a maximum speed better than 300 m.p.h. Rumor to the contrary, this last version is the only Do-17 or derivative which tops the 300-mile mark. The "flying pencil" is actually a flying pencil only aft of its wings, as the front third of the fuselage is quite wide. Its nose, however, is thin—too thin to accommodate a crew adequately. So the swollen-nosed Do-215 version of the Do-17 was built. It has been seen on the front. It also is fitted with the Do-17's variety of engines, except for the B.M.W. VI.

Heinkel He-111K's (as well as Heinkel and Dornier seaplanes) have made many of the reconnaisance flights to England, as well as over France. The Heinkel is almost the only easily identifiable plane in the war—because of the elliptical Heinkel wing. It also has the same fishlike fuselage the noted German designer seems to build into all his warbirds. The ones seen and shot down so far, however, have not been exceptionally fast—265 m.p.h. at most.

Because the fighters are 50 to 80 m.p.h. faster than the bombers as a class, fighter pilots have had things pretty much their own way so far. Speed is apparently the bomber's only defense, unless he has his own fighter escort, but one needs only more attacking fighters to counter that maneuver. The old French theory of many guns protecting the plane on all sides has not worked out so far. No matter how many guns there are firing in no matter how many different directions, the bomber in general has not been able to bring to bear at any particular point the same concentration of bullets or shells the fighter can. And, as the English are demonstrating with their eight-gun fighters, concentration of fire is what counts. The one 300-m.p.h. bomber, however, has already led its English adversaries a merry chase more than once. The designers realized the need for speed in bombers long before this war came along to prove it to them. So the new bombers, of which there are many and they are further along the road from drawing board to service than most of the new fighters in all three belligerent countries, will be plenty fast.

I haven't mentioned much about the big *Flying Fortress* type. They just haven't been used and probably will not be. France has two types in service and England has none. But perhaps what they think of them in Europe (where conditions are vastly different from the United States) can best be summed up by the fact that the first thing General Ernst Udet did when he assumed command of the German air force was to cancel an order for the 22-ton four-motored German Junkers Ju-89.

Let's skip the scouting planes for short

(*Continued on page 78*)

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Vertical Tail Area

(*Continued from page 59*)

gives the plane static stability while the second makes it dynamically stable. The additional area creates a certain "weathervane" stability.

For easier conception of static and dynamic stability, Section 10 shows two sketches. The first indicates the parallel movement of a plane having static stability; the second sketch depicts the oscillating motions of a plane having dynamic stability. The correct amount of oscillation will keep the plane on its path and give more comfort to its passengers.

Naturally the weight distribution will affect the stability a great deal. The farther the weights are from the center of gravity, the more area it takes to make the plane stable. The coefficient indicating the distribution of the weights is the moment of inertia. Its evaluation involves a great amount of mathematical enumeration in order to be applicable to practical designs.

Another factor influencing the size of the vertical tail area is the aspect ratio. The aspect ratio is the ratio of the span of the tail and the average chord. It shows that the greater the aspect ratio the less area is required. Section 11 shows a diagram of the increase of the absolute lift coefficient per degree for various aspect ratios.

Section 12 shows the vector diagram of a fuselage having a square cross section and a fuselage having a round cross section. It designates the advantages of a round fuselage for its close location of the resultants at various yawing angles. The advantage of the round fuselage is also demonstrated in Section 13, which gives it the lowest instability factor.

It was mentioned previously that a high aspect ratio tail is more effective. But, looking at the sketch in Section 14, it would be wiser to use a lower aspect ratio, for it will not give only structural advantages but will also have the same directional stability. The reason for this is that the tail length has been increased. Naturally the interference of the horizontal tail must be taken into consideration in order to obtain the change in aspect ratio. Section 15 shows two accepted locations of the horizontal tail for high and low aspect ratio vertical control surfaces.

The vertical tail is generally divided into a fixed frontal unit, the fin and the movable rear part: the rudder. In conventional designs the rudder area is from 45 to 60 per cent of the total vertical tail area. For estimating purposes, 55 per cent is used. In airplanes with the fin built integral with the fuselage, the rudder is as much as 65 per cent of the total area.

END

Forced Landings

(*Continued from page 37*)

had broken. I had been unable to replace it, so I'd bought a used prop for a 150 Hisso which had been out in the weather. I'd scraped, doped and varnished it. It had held together as long as it could. Again, the point is to try not to have forced landings—but, if you do, don't be afraid.

Today's propellers part company less seldom. But sometimes they do, even when in seemingly good condition. Only a few years ago I lost two blades at the hub of a new prop during an air show. Luckily they left the hub at the same moment. I was flying a Great Lakes powered with a Cirrus and was at the bottom of an outside loop doing 200. I was about 2,000 feet off the ground. The r.p.m. of the motor jumped to 5,000 in a split second. I turned off my ignition switch, half-rolled to normal position and glided in. There was a new prop handy, so I put it on and finished the show. Luckily, I had plenty of speed and plenty of altitude. These are essentials when your engine starts doing you wrong.

I could tell of scores of forced landings, all of which I've walked away from. Once, in Montana, I lost a wheel while flying two passengers. The wheel hung by its brake cable. Not knowing

(*Continued on page 70*)

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(*Continued from page* 68)

this, I gave the customers a zoom and stall. The metal wheel disc hit the propeller and bent it. I thought I'd crashed into another ship. I pulled out of the dive and the wheel smacked the fuselage right between my feet. I turned off the gas and ignition, glided down with plenty of speed, picked an alfalfa field and levelled off. I skidded along on the right wheel. The brake on it had locked. The left hub hooked the ground. The ship went over on its back, the passengers crawled out, asked for a ticket refund and went for a ride in another ship.

On another occasion my motor quit over mountains when I was above an overcast while flying from Cleveland to Portland, Ore. I came down through, landing on top of a mountain 6,000 feet above sea level, in a cluster of young trees.

In every case "I got away with it." Simply by guarding against panic. There is no doubt that the pilot receives an emotional shock when his engine cuts out. Under the stress of this shock his reactions may border on panic unless he has schooled himself. That is why we should always have simulated forced landings in training courses. A pilot can improve his airmanship by constantly checking the surface wind direction, probable gliding range, altitude and a place to sit down if his motor should stop.

But what if it does? Respect the fact that it may. I've had the experience a score of times in a million miles. I know it will happen to me again. Probably many times. But I do not fear it. I repeat at the time of forced landing there must be no panic in the mind of the pilot. And there will be no panic if you prepare your mind to meet the emergency.

"But," you say, "what about a motor quitting on take-off? That's where it's really tough."

Right. That *is* the one danger spot. But the danger can be minimized. A pilot must drill himself again and again *never* to turn back in the event of such a failure. Believe me, it is no easy thing to make your mind force your hands and feet to keep a straight course. Even when a pilot has as many as 10,000 hours he still has a battle to resist that impulse. The first mental command he hears is—

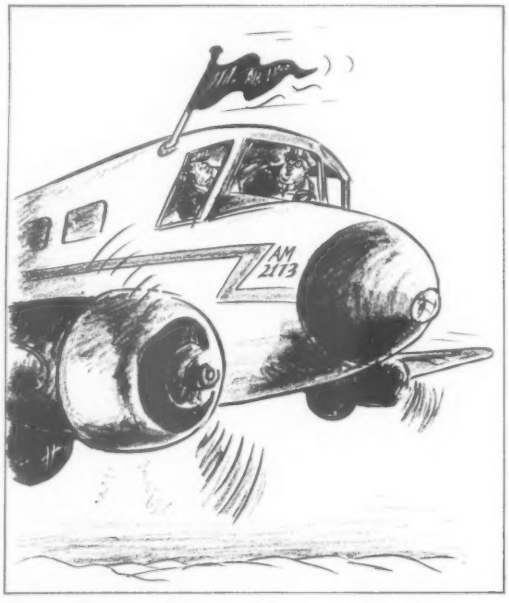
"Save that airplane!"

This is particularly true if it's his own property. It takes far more courage and training to go straight ahead than it does to turn back. I believe that in the next five years two things are going to kill more pilots than all other causes combined.

The first is: not having a clear understanding of centrifugal loading as it affects the stalling speed of an airplane. I covered this recently in an article in POPULAR AVIATION, but will again touch on it later as it plays an important part in the "turn back."

The second is: trying to turn back into the field after the motor fails. Education is the only way to wipe out these two causes of many fatalities.

The danger in the "turn back" lies in the fact that the pilot is going to have to make an almost vertical bank. Now in order to make that bank, he needs a lot of speed. As we well know, in any steep bank a pilot will pull from two to three "G's", meaning that his wing loading has doubled or trebled. Therefore, the stalling speed is higher than in normal flight. The usual attempt to turn back results in the plane striking the ground in a spin. The spin is induced by the pilot trying to make a tight turn with reduced or no power, creating a centrifugal loading of from two to three "G's," raising the stalling speed and topping all that by killing his remaining speed. He kills this speed with his tight bank.



"Hmm . . . I'll say we've got a tail wind!"

Every pilot should prove all this for himself. To do this, climb to 3,000 feet or more, with throttle well open. Observe the air speed and indicated altitude, then quickly pull the throttle back to idle speed. Then pull into a tight vertical as though you were trying to turn back on the take-off. See how quickly the ship reaches stalling speed. If it doesn't spin, level off as soon as the turn is completed. Look at the altimeter. You will see a loss of from 200 to 500 feet, depending on the type of ship you fly. Obviously, had you attempted such a thing on the take-off, a crash would have been the definite result.

What's the alternative, then? First of all, you must not force the ship off the ground and you must not climb at or near the maximum rate of climb of the particular ship you are flying. If you should be climbing at maximum rate on the take-off and the engine quit suddenly the ship, being in stall position, would propably drop off in a spin or an uncontrollable nose dive before you could do anything to prevent it.

You must remember that the atmosphere is very "soft" and that it will not support the weight of the ship with a dead engine unless the wings are moving forward rapidly, thereby obtaining sufficient lift. Remember, also, that when the ship is flying close to its stalling speed the sudden application of full elevators or aileron in a downward position has somewhat the same effect as do flaps. In other words, the full application of any of the three controls would create additional drag at the point of such application and thereby tend to retard the forward movement of the ship.

When, for example, a wing drops down at the beginning of a stall, don't try to recover by using the aileron to lift the wing, because the aileron would only set up a lot of additional drag at the wing tip and help start the resultant spin. The proper thing to do would be to keep the ailerons in neutral and push forward a bit on the control stick. The nose would go down and the dive, even though slight, would restore lift to the wings and prevent a spin.

It is always safe, sane, intelligent and good airmanship to climb only as much as is necessary to safely clear all obstacles after taking off. Never climb at or near the maximum rate of climb, as I've pointed out. Check everything that may cause the engine to lose power or quit entirely on the take-off or initial climb. This can be done from the cockpit before you attempt to take off.

Your check should include, among other things, fuel gauge, fuel valves, fuel pressure, oil pressure, oil temperature, cylinder head temperature and manifold pressure if supercharged. Check r.p.m. and smoothness of engine at full throttle for a few seconds. Use your ignition switch to test each magneto separately. Watch the position of your propeller blades if you are using a controllable pitch or constant speed propeller. A mechanic should have previously checked the fuel and oil lines for leaks, as well as carburetor, carburetor float and accessories.

Get the air speed up to a minimum of 50 per cent above the stalling speed and keep it there during the initial climb. This assures you of complete control of the ship in case of motor failure. It may enable you to make a 45° or even 60° turn safely. It is always best, however, to land straight ahead from a low altitude unless the pilot faces buildings, high tension lines

(*Continued on page* 97)

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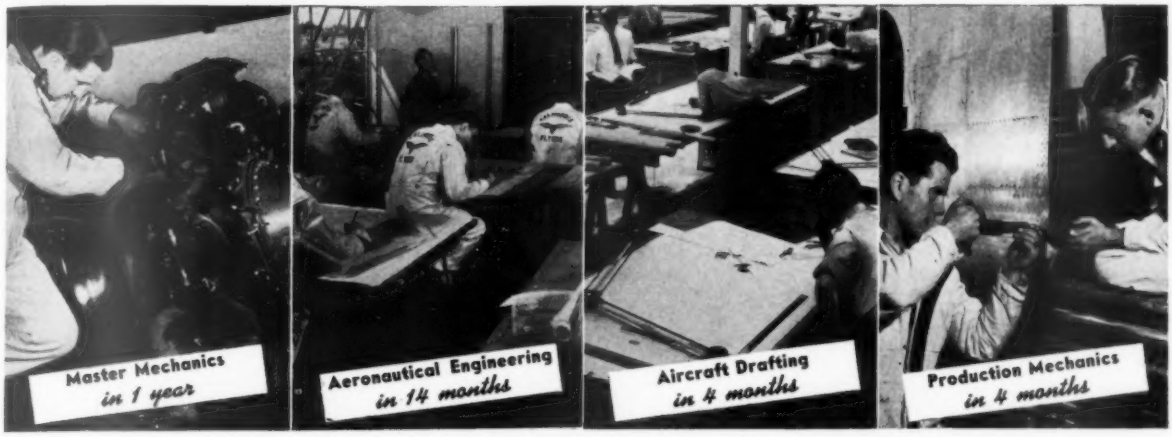

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Air Cameramen Live on Thrills

(*Continued from page* 45)

and neck. In 30 seconds the ship was a magnificent torch. In 30 minutes it was a charred skeleton. A firing pin had been pulled in loading the flares. We might well have got into the air.

But the fun wasn't over yet. A few nights later a pilot landed cross-wind and went into a spin-on-a-dime ground loop. We had 70 gallons of gas in the military belly tank. The undercarriage folded and flattened the tank. High test gas made a pool 25 feet in diameter and a quarter of an inch deep. Again I moved fast. So fast it's a wonder the friction I set up didn't set off that gas. Luckily there was no fire this time.

The greatest thrill I ever had was during the making of "Hell Divers." That was with Wally Beery and Clark Gable. It had a Navy background, so we went to San Diego for location shots. Later we went to Guantanamo Bay, Cuba, Panama and operated over the Caribbean Sea. During the picture I made 15 power dives in Curtiss *Hell Divers*, plunging down at better than 300 beside the diving ships I was filming. I was on the job for 11 weeks, shooting thousands of feet of negative. The scenes lasted less than a minute on the screen.

The first dive topped everything for thrills. The Navy pilots had been ribbing me, had been telling me how centrifugal force had driven fellows through the seats on the pull-out and how I'd probably go blind. I didn't understand the maneuver at first. I thought the ship I was filming would just nose down and dive and that my ship would do the same. When the pilots peeled off—both the plane I was filming and the one I was in—I got the surprise of my life. When one wing dropped and we started down in reverse position two film magazines started floating up in the air. I batted them down as they passed my ear. When I straightened up, the ship was well into the dive. The terrific force of the slipstream plastered me against the rear of the cockpit. I didn't even get my chin down during the rest of it. The ship hit bottom with me still in that position. Due to the terrific force of the pull-out I felt I was going through the floor. Then it was over. I was folded up in the bottom like an old accordion. I hadn't been able to start the camera. Next time I knew what was coming and was prepared. But I never could keep from folding up on the floor during the pull-out.

One of the oddest accidents of my career happened not long ago over the salt flats near Point Magu, about 40 miles west of Los Angeles. Frank Clarke had hopped the camera ship up from Burbank and landed on the flats to pick me up for some special air shots to be used in the picture, "Coast Guard." We had about 500 feet ceiling.

Frank took off, got about 75 feet high, then I felt the ship start to slip. Frank hoisted himself up in his seat and passed me his control stick!

"It came out!" he bellowed.

I grabbed it, got a pair of pliers and tried to get it into the socket in my cockpit. But I couldn't do it. While I fought desperately, Frank was down on the floor of the front cockpit trying to keep the ship level by pulling and pushing on his socket and the elevator cables. Even with pliers, I couldn't get the stick in. I realized that we might have a chance if I got the free head handle—a long metal shaft like a bicycle handle bar, only straight—from the camera; it allows me to aim my camera with accuracy on objects I'm photographing. I grabbed the handle and passed it to Frank. It had a smaller diameter than the regular stick. He jammed it into the socket and made something like a landing.

"Tell Oglesby not to bother with that engine if it's too much trouble . . ."

When we got down I realized that we had been practically out of control for 15 minutes under that low ceiling. I was glad to get back on the salt flats. We rested for a little while after replacing the regular stick. How it happened to come out neither of us know to this day.

The jobs we air cameramen draw—there are only three in the business—are all pretty tough. But I think the toughest one was the job I did on "Test Pilot," another Clark Gable opus. We had to show what the ground looked like from a racing plane. Mantz flew his Lockheed *Sirius* from 20 to 50 feet off orchards, washes, river beds and pock-marked fields at 160 m.p.h. After hours of that a fellow is glad to go home to his overstuffed chair and just relax.

One of the prettiest jobs I ever saw done was Clarke's 2,000 foot stall against the background of Long's Peak in Colorado for "Night Flight." Frank was flying an old Army Curtiss *Falcon*, supposedly crossing the Andes. I was flying alongside. We were at 14,600 feet. Beneath us was nothing but trouble—jagged cliffs, rocks, snow and ice. He started his stall at the top of a solid rock wall which rose 2,500 feet straight up from its base. He rode it down like an elevator. He balanced the ship on its stick and seemed to mush straight downward. My pilot and I came down with him, more or less. It looked swell on the screen later.

My closest call came when we were flying along the east side of California's high Sierras. Mount Whitney goes up to better than 15,000 feet near Bishop, Calif., and the wind boils over the range and down into the desert. Bumps of 200 feet are the usual thing. Tex Rankin was supposed to be flying his Great Lakes with serum for a dying patient in "Made for Each Other." He was bouncing up and down like a cork. So were we. I was in the rear cockpit of an open biplane, camera on its swivel, trying to line on Tex when Clarke hit a wild bump. The ship dropped out from under me and I had the feeling of sailing through the air with none of the ease of the proverbial trapeze performer. I was just saying bye-bye to ship and Clarke when I managed to grab the camera. I discovered that I'd failed to anchor my gunner's belt—same as that worn by Army aerial gunners—to the inside of the fuselage. I fastened it very, very quickly after that.

Fire in the air is something else I haven't missed. On "Thirteen Hours by Air," which starred Fred MacMurray, eight of us were up in a Boeing over Salt Lake City. The undercarriage motor developed a short and the ship filled with smoke. The pilot headed for the lake while the co-pilot sprayed an extinguisher. It was a two-minute thrill while it lasted.

My work has taken me nearly everywhere in the northern hemisphere. I got to Honolulu for "Hell Below," and had the quaint experience of shooting scenes 10,000 feet in the air one day and 100 feet beneath the ocean's surface in a submarine the next. I went to Alaska with Garland Lincoln to shoot scenes of the rescue of the Russian pilot, Levanesky, by Jimmy Mattern—which, unfortunately, never came off. Our expedition in a tri-motored Ford was ill-fated, and we ended with the ship on its back in a tundra, as Lincoln has related in the May, 1939, issue of POPULAR AVIATION. As far as I know, parts of the ship are still in the sub-arctic ooze.

I've worked with the famous "Sea Hawks," the great Navy formation flyers: Tommy Tomlinson, now an airline executive, "Putt" Storrs and Bill Davis. In fact, we almost got curtains in one of these flights. The trio went upside down. Putt started sliding out of formation. My pilot and I, flying upright along side them, didn't realize this until Putt's cockpit filled my camera finder. My pilot realized the danger and slid off. Davis said afterward that the planes were within six feet of

(*Continued on page* 92)

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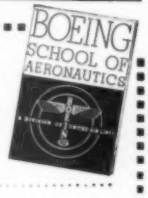

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BOEING SCHOOL OF AERONAUTICS UNITED AIR LINES A DIVISION OF UNITED AIR LINES

The Flying Chinese

(*Continued from page 26*)

whose guns wrote a fiery chapter in the dark pages of the eastern conflict—and whose short but spectacular life came to a violent end almost before it had begun. Chen, son of a noted Canton revolutionist, entered the Canton Aviation School at the age of 15 and even then, at a time when most other youths were still busy with school and play, he was already showing his brilliant talents for man-made wings.

In 1932, before the Mikado's shadow had begun creeping across the wall of China, Chen and six other pilots flew from Canton to Shanghai in some old Douglas observation ship to fight the Japanese in the air. These six men were the pioneers of China's air force. It was their almost disastrous engagement that revealed the power and size of the enemy's sky fleet and laid bare their own puny strength.

Chen came home burning with two great ambitions: train more pilots, get bigger and faster ships. His enthusiasm finally won him a post as director of the Wuhu airdrome. He worked there feverishly in the months and years preceding the present war, training pilots, squeezing his budget for the best ships money would buy, preparing for the tragic day he knew must come. But when the war finally broke out, Chen's restless blood rebelled at the relative quiet and inactivity of his director's job. He resigned the post, rejoined his old squadron and, within two weeks, was on duty at Chuyang, the protective outpost for the air force headquarters of Nanking.

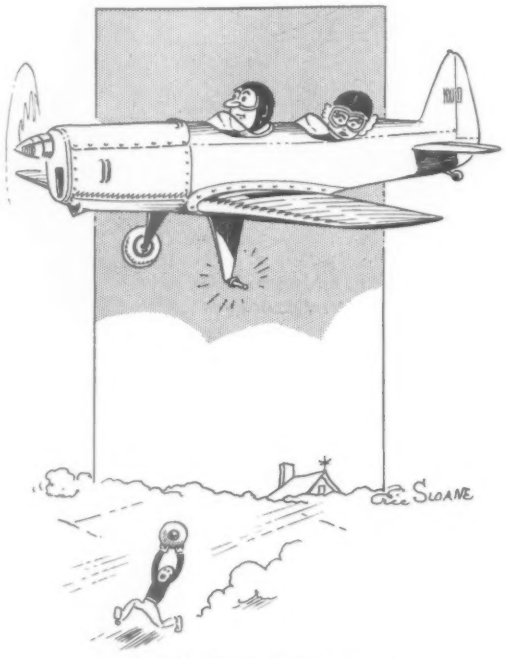
In one riotous month, August, 1937, Chen and his hell birds strafed General Kisarutusu's Japanese air fleet until that urbane worthy was wistfully longing for his cherry garden. Chen bombed the Japanese naval fleet on the Chenkiang coast, sank a Japanese army transport single-handed and, with his men, blasted 10 Japanese planes out of the air. Chen was then transferred to Siukwan in Kwangtung province, but he was still buzzing like a mad hornet. On October 17, when 16 Japanese planes raided Siukwan, the 26-year-old ace personally accounted for three of them in a 45 minute battle. Chen came down with a cracked prop, one flat wheel and a foot ripped by Japanese slugs.

He was still under treatment two days later when a formation of six Japanese planes showed up unexpectedly.

"I'm going up after them myself," he said. And he did, roaring away from the field before his startled fellow flyers could stop him. In the next 15 minutes this wild young pilot killed the observers in two of the Japanese planes, forcing the pilots to land their damaged ships behind Chinese lines, drove two others to flight and started after them for the kill.

But the last two planes caught him by the tail, and tattooed his back before he could roll away. Later, when a first aid crew reached the spot where he had crashed, there was nothing left of Chen Chi-wei but ashes—and the memory of a brave and zealous youth.

There seems to be a strange spiritual quality about these men who fly for China. There is something that is perhaps not so characteristic of other races—courage and patriotism tempered by the oriental philosophy that sees, not fear, but peace and beauty in death. It is a creed best expressed by the simple oath sworn by all Chinese pilots before they receive their wings: "I shall live or die for my country."



"Oh look, honey! There's one of those live-wire tire salesmen!"

Many have lived, but many others have died. Too many, perhaps. Because in China—as in other countries—the air force is composed of the very flower of its youth, the sons of fine families educated for everything but war, and with an average age of 20. Among these boys—for they were hardly more than that—were Capt. Li Kwei-tan, who was shot down over Hankow as a bloody climax to a string of a dozen straight victories; Lieutenant Chen Huaimin, who smashed into a Japanese plane in mid-air and died in flames; Lieutenant Yen Hai-wen who, when forced down behind Japanese lines, machine-gunned a dozen infantrymen who tried to seize his plane and then ended his own life with a bullet through the brain.

All these were the heirs of venerable families destined for great careers in international banking, diplomacy and other fields. None was over 20 years old. Even Com. Hsu Huan-sheng, whose squadron made the historic flight to Formosa and dropped the much-discussed "good will" leaflets, had not yet reached his majority before that trip.

Accurate and detailed facts on the Chinese air force are not generally available. As in most military matters, there is a cloak of great secrecy around the small but aggressive corps now quartered at Chungking. Questioners are apt to be met with blank stares and the traditional Chinese "poker face." There is nothing unnatural in this attitude, of course, particularly in the United States whose factories have been supplying most of the Chinese war planes.

At this writing the bulk of the ships are Curtiss, Martin, Lockheed and Boeing, with the Russian, French and British supplying the small remainder. Generalissimo Chiang Kai-shek and Mme. Chiang travel everywhere in their own private Seversky, with regular Army pilots. Mme. Chiang, long the guiding spirit of the air force, is acutely aware of the value of fast, maneuverable ships and it is known that she prefers the American makes. Mme. Chiang, incidentally, invariably wears an air force insignia pin studded with diamonds.

Handicapped by lack of funds and a national air consciousness, the Chinese air force was slow in building. Its greatest nucleus, in fact, was a mammoth gift of 50 planes presented to the government at Shanghai on Generalissimo Chiang's birthday in 1937. The planes were a gift from the people, purchased with donations gathered from every remote corner of the republic. In addition to the three pursuits mentioned earlier as coming from California, there were two sent from Cuba, three from Burma, two from Siam, one each from Canada and New York City and another from Hongkong—all in the spring of 1939. The fact that these Curtiss pursuits were originally bought in the United States and were subject to possible sabotage in shipment accounts for some of the secrecy in which these deals were shrouded. The planes all reached their destinations, however, and have since been credited with sensational victories in combat between the Chinese and Japanese.

Until recently, a Japanese pilot forced down in Chinese territory had about one chance in a hundred of escaping alive.

(*Continued on page 93*)

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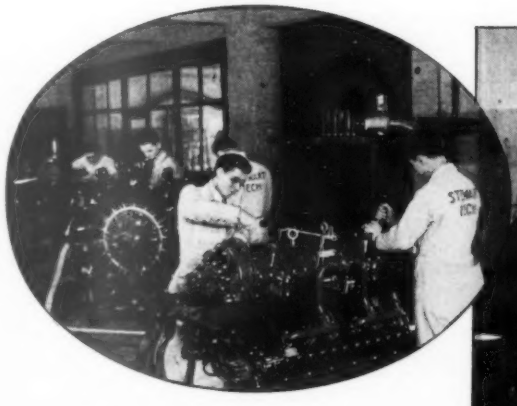


Aircraft master mechanic students at work on airplane engine.

Partial view of one of the classes in aeronautical design.

Pioneer Ace

(*Continued from page* 54)

"le Vengeur"—upon the fabric of his tiny craft. He was confident that once his theory was proven he would, in reality, become the avenger of those early bird French airmen who had been killed in action.

Just as a golden sun came up beyond the snow-capped Vosges mountains an L.V.G. roared down out of the blue. The Boche pilot nodded to his gunner behind him—an easy early morning kill was in their bag.

But, instead of hi-tailing it for a safe corner in the sky, Gilbert deliberately sent his flimsy little airplane straight toward the enemy two-seater. The Hun gunner swung his Spandau around on the tourelle and sent a long blast at the daring Morane pilot. The Frenchman recklessly flew into the face of a withering storm of lead. Slugs flacked the fabric, tore it from fuselage and wing. The little ship shuddered from prop to rudder as lead gnawed at its wooden frame. But Gilbert held his course, flew straight toward the enemy. He weathered the withering fire until he was but 50 feet from the L.V.G. Then breathless with hope he yanked the trigger wire.

Plac-plach-plac-plach.

The Winchester rifle sang its brief song of hate. In this first instance of a fixed gun firing through a revolving propeller Gilbert had succeeded in hitting the enemy plane, but failed to hit either gunner or pilot.

The young lieutenant veered off, reloading his rifle. Eager, self-confident and fearless to the point of recklessness, he turned time and time again, carried the fight to the better equipped, more deadly E.A. On his ninth attack, his ship slashed and ripped to shreds, Gilbert uttered a cry of abject disappointment. His own bullets were striking his propeller! The Morane began vibrating freakishly. The vibration soon tore loose the straps holding his Winchester to the fuselage. Soon the rifle, in which Gilbert had staked his life, dropped from the plane.

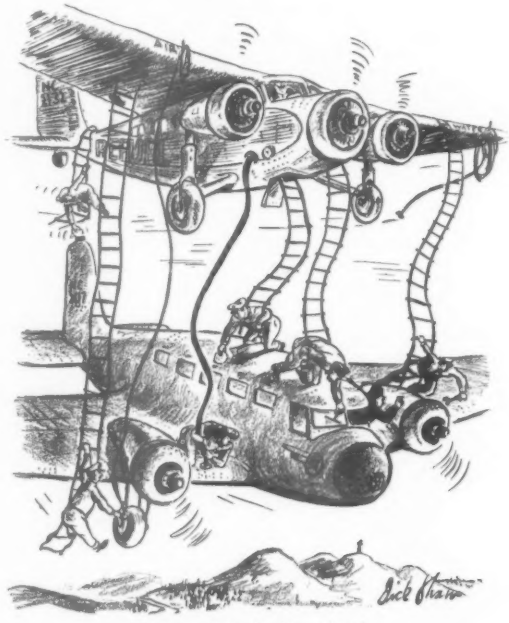
With nothing but his flying skill to defend him from being killed at point blank range Gilbert did a miraculous bit of flying and nursed his crippled Morane back to MS 23. He landed and wrote it off the duty roster. The Morane had been struck more than 300 times by Spandau slugs.

Big name pilots of the escadrille—Captain de Beauchamp, Maxime Lenoir, Marc Pourpe, Armand Pinsard—were quick to tell Gilbert he was a brainless fool. Only Garros encouraged the dejected Frenchman.

Undaunted, Gilbert beseeched the aviation supply depot to issue a machine gun to be attached to his Morane. When his request was refused he did a little fancy soldiering by stealing a machine gun from an infantry regiment returning from the front lines.

He mounted the Hotchkiss on a new Morane so that it fired over the prop. Despite the fact that he was forced to stand up in the cockpit to fire the crude arrangement, Gilbert went L.V.G. hunting. When rushing in to make a kill, the Hotchkiss jammed and the luckless Frenchman had to go into a 5,000 foot power dive to escape the Hun on his tail.

The fact Gilbert had fought two duels single-handed against enemy two-seaters attracted an air general's attention. A Nieuport soon appeared at the Front—



"Never mind checking the deicer fluid. I'm in a hurry . . ."

the first ship to be equipped with a mounted machine gun on the upper wing. Gilbert had awakened the French Air Force to the possibilities of the single-seater as a fighter instead of a scouting plane.

By now Garros had gone to work to improve upon Gilbert's idea. He sheathed sections of the propeller blades with metal to deflect the one-out-of-seven bullets that was calculated to hit the revving prop. Soon both men mounted Lewis guns on the cowling of their planes—the first installation of its kind in the war—and both made history. Gilbert was on the threshold of aerial dueling to the death.

In the Spring of 1915 the German air force had also taken notice of Lieutenant Gilbert. "This Frog that was experimenting with a forward firing gun was silly, of course, but dangerous. He might solve the problem. He should die before he perfects his work!" Orders were issued to "exert all diligence to locate and shoot down a Morane monoplane of the French 23rd Escadrille bearing the painted words on its fuselage 'le Vengeur'."

The Hun pilot and gunner of the L.V.G. knew where to look for Gilbert. Early one morning they spied him flying alone several thousand feet below. The Huns, grinning in great glee, roared down to drill the crazy Frog out of the sky and win for themselves glory and the Iron Cross.

Gilbert saw the confident E.A. and stormed in for a close range shot. The Germans actually laughed when they saw the infantry Lewis gun mounted on the Morane's cowling. How could a pilot fly and shoot accurately at the same time?

Gilbert showed them.

Fired with heroic determination that his invention should not fail this time, Gilbert emptied a drum at the German plane. He saw his tracers march with precision along the L.V.G.'s canvas side before the pan was empty.

The Morane veered off and Gilbert tossing away the empty drum, worked feverishly to put a larger drum in place. The Hun pilot, seeing that this was the opportune moment to strike, came roaring in at full speed. The gunner stood in his cockpit, swinging his Spandau around for the easy kill.

Gilbert rolled out of a tight turn and, to the Huns' amazement, came tearing at the L.V.G.'s side. The Frenchman, his finger trembling with eagerness, pulled the trigger. He was so close that he had only time for a short burst before he had to zoom to keep from tearing his prop through the E.A.'s side.

Rolling out of the zoom, Gilbert looked down and a yell of great joy wrenched from his lips. The gunner was clutching at his riddled stomach. Soon the Hun was lolling over the gun ring, his life's blood blotching the fabric of the plane.

The German pilot, seeing his gunner die, and realizing that he was defenseless against the mad Frenchman, promptly went into a desperate power dive. For 4,000 feet the two planes thundered down toward the earth. Gilbert recklessly risked losing his flimsy wire-braced wings in that dive of death. But steeled determination rode his rudder and stick. He had a mission to complete. He had to prove to the French generals that a single-seat pilot could fight and down enemy two-seaters.

The Hun pilot came out of his dive above the trees and Gilbert ruddered to dress the enemy pilot in his sights.

Rat-tat-tat-tat.

The tracers of the first burst showed too much right rudder. The second burst

(*Continued on page* 78)

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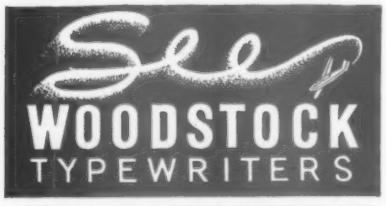

(*Continued from page 76*)

was a little to the left. The third burst found the helmeted knob of the frantic Boche pilot's head.

Mad with joy, Gilbert danced his Morane in reckless acrobatics in the sky. He was vindicated. His idea was now longer a crazy, impractical dream. He had proven to the world that a single-seater could master two-seaters. Lieutenant Eugene Gilbert had made military aviation history.

Lieutenant Gilbert was decorated by a grateful nation. Greatly admired as he had been as a citizen aviator, Gilbert now found himself the hero of the French air force.

Fate frequently takes an ironical twist in shaping the destinies of great men. Gilbert was never to achieve the coveted rating of ace. He is officially only credited with having shot down three enemy aircraft.

But, by the Summer of 1915, the French staff regarded Lieutenant Gilbert as their greatest of all pilots. It was recalled that the young Frenchman was the champion long distance flyer of the world. A daring plan was conceived—to bomb the great Zeppelin hangars at Friedrichshafen, nearly 200 miles away. Only Gilbert could fly a small craft loaded with high explosive bombs such a distance with any certainty of success.

Lieutenant Gilbert was assigned to this spectacular mission, which many thought decidedly more crazy than Gilbert's early theories. The French hero made the dangerous flight, bombed the hangars successfully, but was pursued by a score of enemy pilots, who ripped his weary plane to bits with Spandau lead.

In the midst of a mad scramble of enemy pilots, Gilbert's face was slashed with a gust of boiling hot oil. Broken feed line! He pawed at his nearly blinded eyes and worked the rudder desperately. T he Frenchman was in a death trap. He could no longer fight. To land would mean a dreaded German prison camp—slow starvation. It was out of the question to glide back to the French lines.

Gilbert veered sharply to the left. He nursed his dying motor. Switzerland was off there somewhere. If he could only make it. A little later the motor, running dry of oil, froze. The prop stopped. Gilbert went down in a long series of glides to make a dead stick landing.

Swiss guards rushed to place him under arrest. He had escaped almost certain death to be interned in Switzerland for the war's duration.

But the hero of France had no intention of staying confined. He escaped and after considerable difficulties was again flying behind the Front as an instructor. In May, 1918, he went aloft to test a new monoplane with a 300 h.p. motor. Army officers and factory officials were on hand to see how the new secret ship would perform. They were horror-struck to see the ship shed its wings in a dive. They gasped aloud as they saw Gilbert, flung clear of his plane, clutch a wing strut and hang onto the falling craft. But the terrific speed with which the plane was falling tore Gilbert from the wing. His body struck the ground about the same instant the plane did. The plane burst into flames.

The bright flames seemed dull compared to the brilliance of I 'eutenant Gilbert's glorious service to his country. He proved and gave to the world the single-seat pursuit ship. Gilbert, denied Ace-hood, not only served his country heroically, but made it possible for legion of other pilots, Allied and enemy alike, to achieve great honors.

END

What's At the Front?

(*Continued from page 66*)

distance over-the-enemy-lines work, too. France has no special type, using other planes as necessary. Germany has the Henschel Hs-126 and England the Westland *Lysander*, both high wing monoplanes—very nice high wing monoplanes, indeed, and necessary types and all that, thank you, but nothing exceptional.

The real hot articles, led by the Me-110, are the twin-engined fighters. France has the oldest and slowest—the Potez "63". But France also has coming along the speedy LeO (370 m.p.h.), Breguet 690-1 (340 m.p.h.) and other types. England has one also. They have not yet written more than a few words of their chapter in World War II. They will some day soon, and it will be an important chapter.

END

Watchful Instructors

INSTRUCTORS should continually watch the air work of their students to prevent overindulgence in acrobatics and formation of sloppy habits, insurance engineers point out. A studen. who flies without the constant surveillance of his instructor is not getting full value for his money; the instructor is very likely to have a crackup on his hands. If the instructor is unable to give constant attention to the activities of his students, he should not instruct or should not let a student fly until he can find the time.

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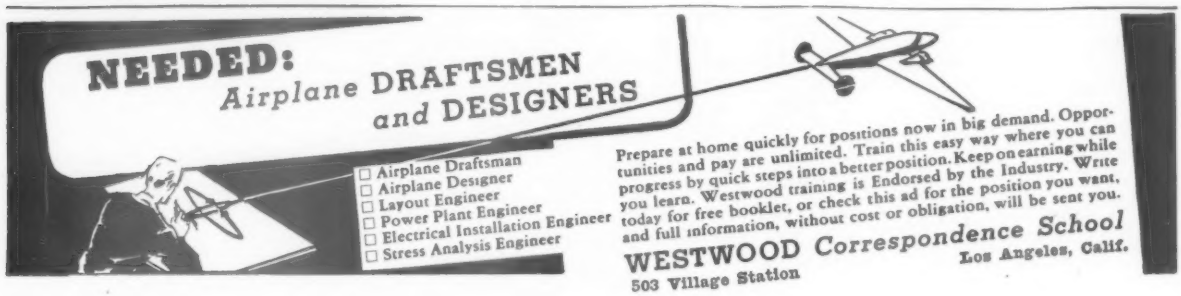

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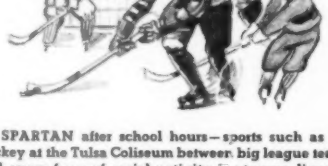

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Remarkable Boat

(*Continued from page 30*)

minutes (the present record) was required by 15 PBY's led by the same Lieutenant-Commander LaHache last June. And Coco Solo, 3,087 miles away, has been reached from San Diego in only 22 hours, 20 minutes, by a 14-plane squadron. These feats by no means exhaust the admirable potentialities of the PBY-type.

Fletcher Pratt, the eminent Naval expert, is authority for the astounding, virtually unbelievable revelation that a PBY, in the 1939 Caribbean maneuvers, remained in the air *three days continuously*, traveling 15,000 miles as it kept on the tail of the "enemy" fleet. Just how this was accomplished has not been disclosed, officially or unofficially, as the PBY's 1,700-gallon gasoline capacity allows a non-stop range of only 4,200 miles. Were extra tanks installed in the hull? Was the working crew reduced to save weight? The Navy has not confirmed this sensational report, but if any element of truth exists in it, startling are the possibilities of day-and-night scouting thousands of miles from the United States.

Meanwhile, a private citizen—the wealthy Standard Oil heir, Richard Archbold—and the flight crew of his $250,000 "Guba", showed the Navy what terrific punishment its patrol planes will take under the most severe flying conditions conceivable and in widely varying climes. Archbold and his chief pilot, Russ Rogers, were the first to fly non-stop across the United States in a seaplane. This was done in the "Guba" on June 24-25, 1937—from San Diego to New York, 2,700 miles, in 17 hours, 3 minutes. And, to prove this could be made as much a routine as the Navy's ocean hops, Archbold did it again the following December—San Diego to Miami, 2,300 miles, in 14 hours, 10 minutes. He did it still a third time, again to Miami, on Feb. 26, 1938, in the creditable time of 12 hours, 35 minutes.

After due consideration of these performances, the Navy decided they were not mere stunts and had tremendous tactical value. They sent one of their own ships across—not quite as far, but nevertheless on a transcontinental trip, from San Diego to Pensacola. This has been done several times since with individual PBY's, the Navy having yet to risk a mass flight of seaplanes across the nation.

Aviation experts will tell you this is not as hazardous as it appears at first. There are plenty of sufficiently large water bodies to accommodate a PBY in an emergency during a transcontinental crossing. These water bodies, they will assure you, are closer together than emergency landing fields capable of harboring today's giant transports or Army bombers.

All this was done by Mr. Archbold in the same "Guba". There have been two "Gubas" (the name is native Papuan for "Sudden Storm"), with the first one purchased by the Russian government for Sir Hubert Wilkins shortly after the initial cross-country trip to New York in 1937. In this craft and with the Archbold flight crew, Wilkins searched for the Russian ace, Levanevsky, and his lost shipmates in the polar regions north of Latitude 80. The manner in which this airboat performed again found keen interest among Navy officials. Nineteen thousand miles were covered in flights of tremendous non-stop distances. To the 1,700 gallons of gas contained in the wings were added a large quantity in drums carried within the hull. This, in addition to the bulky supplies and equipment and the heavy drag of ice coatings on wings and tail surfaces, at times put the boat to tests possibly more severe than any ever administered under normal operating conditions.

A startling sample of the PBY-type's versatility was again afforded by Archbold, in the second "Guba", acquired after he disposed of Number One to the Soviet Union. This ship, perhaps the most famous privately-owned airplane in the world, has an amazing record of "firsts" to its credit. In its use as a transport for an American Museum of Natural History expedition in Netherlands New Guinea, and as a survey ship for a new commercial route planned by the Australian government, it accomplished the following:

1. First to fly from Guam to Netherlands New Guinea, 1,900 miles.

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3. First airboat to span the Australian continent non-stop, 2,200 miles from Sydney to Port Hedland.

4. First airboat to cross the Indian Ocean, 5,400 miles from Port Hedland to Mombasa, Africa, on a survey flight for the Australian government to demonstrate feasibility of a new commercial air route.

(*Continued on page 82*)

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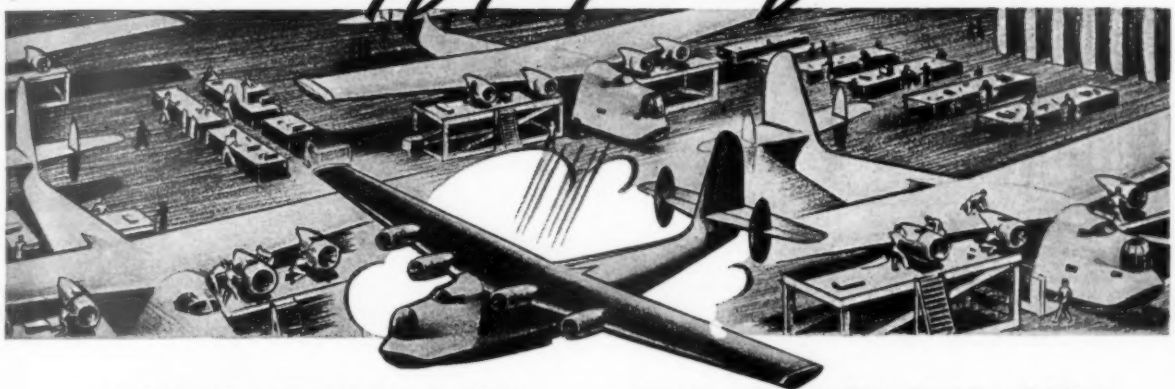

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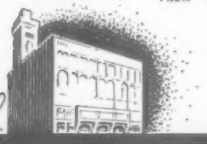

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APRIL ISSUE

POPULAR AVIATION

ON SALE MARCH 10

(*Continued from page* 80)

5. First to fly from the west coast of Africa to the Virgin Islands, making it holder of the world's record for non-stop over-water flying, 3,300 miles on this jump.

6. First airboat to circumnavigate the globe the longest way—25,000 miles—with San Diego as the starting and ending point.

When Russ Rogers and company returned to San Diego last July they stepped out of the "Guba" and into another Model 28, with markings of the British Royal Air Force on its wing and hull. In this they demonstrated to the United States Navy another stunning possibility—easily accomplished flights of bombers across the Atlantic between Europe and the North American continent. They took the PBY replica, which the English government bought for experimental purposes with a view to possible large-scale production, from San Diego to Buffalo, N. Y., then to Botwood, Newfoundland, and finally directly across to Felixstowe, marine aircraft experimental establishment of the Royal Air Force on the North Sea.

That gave the Navy experts plenty of food for thought, not only as to the ability of the PBY. A horde of bombers flying in the opposite direction could no longer be considered as pure fancy. There is irony in the sale of a PBY to England. Glowering at Great Britain from the other side of the diplomatic fence is Russia which also boasts not only a PBY but a complete set of plans and tools for the mass production of these airboats. In 1937, Consolidated sent a corps of 10 engineers to Taganrog, Russia, on the Sea of Azov, where the technique of American manufacturing was introduced at a huge plant. Preceding the technicians were a complete PBY, parts for another and the design and tools. The enigmatic Russians claimed the ships were to be used for commercial, cargo-carrying purposes. Yes, it was all done with the consent of the U. S. Navy, whose strategists are well aware of the fact that Alaska is not too comfortably distant from Siberia.

The Atlantic was transversed half a dozen times last summer by another Model 28, purchased by American Export Airlines for survey flights preparatory to establishing a regular service.

American aviation knows no more glorious chapter than the military and commercial saga of the PBY-type flying boat. And from it greater developments have sprung. There is the mighty four-engined XPB2Y-1, several of which are under construction for the Navy, and the experimental twin-motored (2,000 h.p. Wright *Cyclones* each, the largest ever installed in a plane) Model 31, said to be the fastest and longest-range airboat in the world.

But engineers are looking beyond these, to the other side of the horizon, where the flying wing is awaiting practical application. As for the airplane of tomorrow, based on proved principles of design and construction, the PBY's chief engineer, I. M. Laddon, has this to say:

"It will carry up to 300 passengers with baggage, mail and baggage, or mail and express and have a range sufficient to cross any ocean or continent with a safe reserve of fuel. Flying at well over 300 m.p.h. in the stratosphere where ideal conditions for smooth, fast flight exist, the passenger will find a modern expression of the fundamental urge to travel, in keeping with an age of speed."

END

It Takes Headlines

(*Continued from page* 53)

tion announced some ground schools in the Wisconsin vocational schools, the W.C.A.C. wrote the district NYA supervisor offering corps members as volunteer speakers and equipment for part time use. That also got publicity and it was a worthy public service.

When the Community Chest drive starts let your organization offer a couple of planes to fly signs over the city. Organize a speakers bureau and let the various civic clubs know that the emminent attorney, Joe Doakes, is a member of the Whoosis Aviation club and he'll be glad to talk free at one of their noon luncheons. Send your speakers before high school and grade school assemblies, to Boy Scout and Girl Scout meetings, down to the Y.M.C.A. You'll be amazed how gladly they will be received.

If possible, get an unusual twist on your normal activities. That makes for news. For example, the W.C.A.C. planned a navigation race from Milwaukee to Kohler, Wis., back to West Bend, Wis., and then into the Curtiss-Wright airport at Milwaukee. Normally that would have been worth maybe two paragraphs in the newspapers—one to announce the race was to be held, another telling the winners. Some wise member of the corps remembered the state and nation was wrought up over the dual Thanksgivings; one on November 23 for FDR, the other on November 30 for the Republican governors.

So the group announced a Turkey Day race to be held the Sunday before Thanksgiving the First with turkeys, geese, ducks and chickens (all donated) for prizes and got themselves a couple of good feature stories.

At the annual hobby show in Milwaukee's huge auditorium, the same organization carted a small plane from an airport through the downtown streets, set it up along with other things as an exhibit and kept someone on duty to explain controls, struts and whatnot to the thousands who saw the hobby show.

The possibilities for legitimate publicity for your aviation organization are bounded only by your imagination and the worthwhileness of your activities. But remember—only *good* publicity is news.

END

Government Sailplane

THE first sailplane ever to be ordered directly by the U. S. Government recently was delivered to a Government soaring school project at Cassidy Lake, Michigan. The sailplane was completed 19 days after the order was received, although the order itself called for 30-day delivery. The ship was built by the Bowlus Sailplane Company, San Fernando, Cal.

XUM

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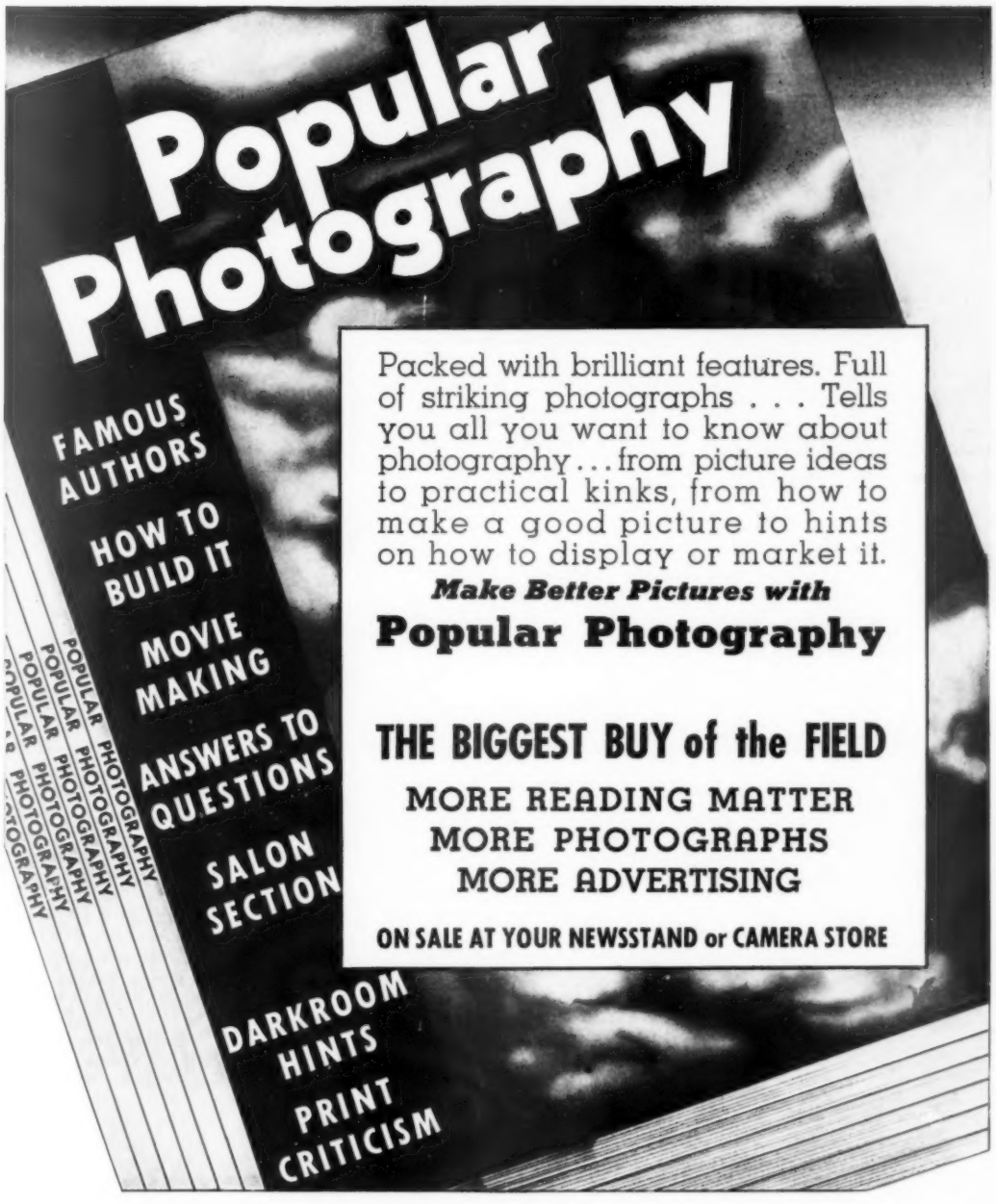
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Lightplane Nomad

(*Continued from page 43*)

human nature, diplomats, salesmen and, above all, conservative flyers. When a distributor's or dealer's prospect insists on going aloft alone, the selling nomads must dissuade him tactfully until his flying abilities are established. Wrecked ships cost money.

Their headquarters are in their suitcases. They must know their cross-country flying as a metropolitan commuter knows his time-table. They must be willing to spend a Thanksgiving Day in the midst of the Everglades, munching on a burned hamburger sandwich. Bill Strohmeier did that once, in Okeechobee, Fla.

Of course, there are compensations. Factory liaison men always have a new ship under the seat of their trousers. Bill's 1939 coupe, looking little the worse for wear, has rolled up 600 hours since last January. An average of more than ten hours a week. Sometimes he puts in 35 hours a week, or five solid hours a day. In good air the job is fairly simple. Bill smokes, enjoys the countryside, reads or writes. When he knows he is off airline courses and his altitude gives him clear sailing, it is not uncommon for him to catch up on his letter writing. There seldom is time for that, once his wheels are on the ground.

Then there always is the unexpected. Once he landed at an airport in Maine. A tourist camp was flush on the edge of the field. Bill taxied over.

"I'd like a cabin," he told the proprietor as he cut his switch and climbed out.

"Pretty expensive," grumbled his potential host.

"How much?"

"Well, it'll cost you two dollars."

Not until the next morning did Bill discover that they just didn't like aviators there. As the proprietor expressed it, them flying fellers cut up too much. Two dollars was supposed to be a prohibitive price. Shades of the prices they charge for those tiny cubicles in New York hotels!

Then another: It also was in Maine, in a place called Skowhegan. Bill thought he had a sale tied up for the regional dealer. He had worked hard on this one. As he did a 360 turn around the port and squared off for his approach, he thought of the work he had done to nail this one down. As he put it down on three points a kid ran toward the ship waving a slip of paper.

"From Mr. So-and-So," said the kid, naming the prospect.

Bill stared at the note. "Dear Bill," it said, "can you lend me two dollars for cigarettes? Can't come to the airport. Can you come to see me?"

Bill did. The prospect was in jail.

Bill sat down a short time ago after something happened which, sooner or later, happens to anyone who goes aloft on wings. For the first time in 1,900 hours of flying, Strohmeier found an overcast suddenly closed in complete beneath him. He had taken off with scattered cumulus dotting the sky. Now he was looking anxiously for a break, with a limited supply of gas in his tank. His course had been from Scranton, Pa., to Roosevelt Field, on Long Island. He cruised around, trying to spot a hole in the vicious-looking stuff below. A rift opened up. He dived for it, levelling off underneath with a minimum of ceiling to spare.

Then, under a wingtip he spotted a name: "Newfoundland."

"Now, let's wait a minute," he ruminated, pulling up the nose to think. "Newfoundland. How in the devil would a man fly to Newfoundland in a *Cub* in two hours and ten minutes? It doesn't make sense."

When he had slipped the ship into a convenient hay field and cut his switch, a native enlightened him.

"Newfoundland?" said Bill.

"Yeah, Newfoundland, Pennsylvania."

His 90 m.p.h. *Cub* had made exactly 25 miles in 130 minutes of flying time.

"But flying is getting too darned common for a man to be a hero any more," supplemented Strohmeier in telling the story. "That first guy who came up owned a *Cub* himself. The third guy owned a Bird. I was just another pilot."

Finally, there was the time Strohmeier spent the night at the home of a prospect in Delaware. In the middle of the night he was awakened by one of the worst commotions he had ever heard—apart from an OX-5 parting company with a cylinder head.

Presently his host opened the door. "Now don't get excited, Bill," he said, "but I thought I'd better tell you my sister is having a baby downstairs." It unnerved him just a little when he discovered that they had named the kid Bill.

It is no ordinary job, sales work. Strohmeier was graduated from Amherst. Three other members of the Cub factory sales force are college graduates. Between them, they must cover 40 distributors and 350 dealers throughout the nation.

Perhaps, after all, Strohmeier is not a typical salesman, a typical new-day flying nomad. He was "in" aviation back in 1923, when he was nine years old, building model planes.

Five years later he, his brother Dan and his father—who is professor of

(*Continued on page 86*)

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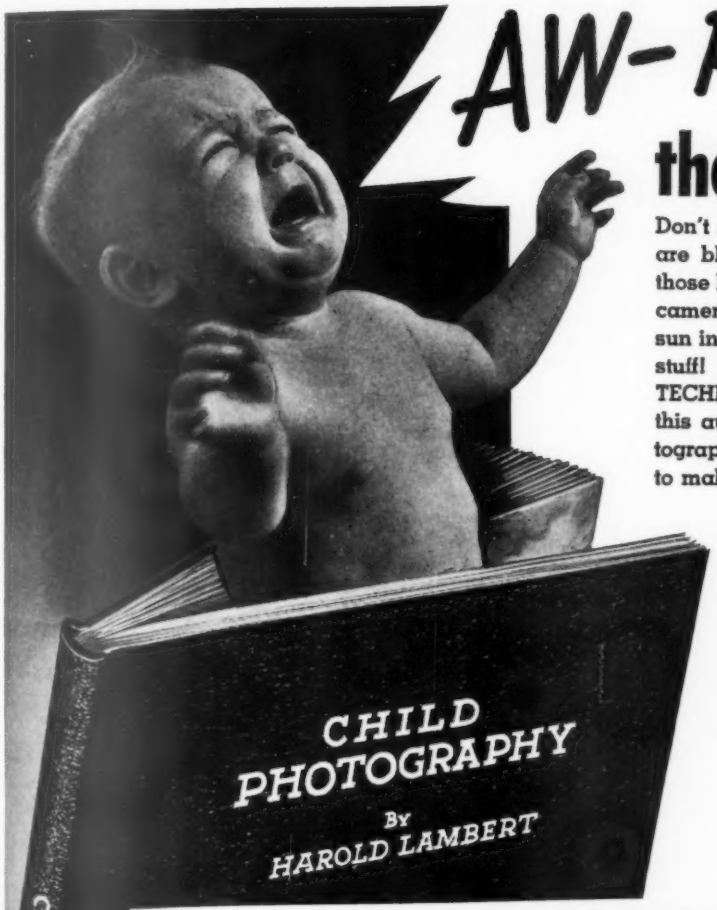

that's not the way!

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(*Continued from page* 84)

mathematics at the famous Peddie School in Hightstown, N. J.—were passing an airport in a rubberneck wagon.

"Want to take a flight?" asked Professor B. A. Strohmeier of his sons. For answer, they scrambled out of the bus's windows before he could change his mind. That ride in a J-5 Fairchild settled the question for Bill. He would fly for a living.

He began taking lessons on the quiet while he was still in college. He had to do it secretly. His family already had raised objections. It was not until 1935 that Bill finally soloed at Northampton, Mass. By that time his parents had become resigned to his flying.

He was one of the organizers and the first president of the National Intercollegiate Flying Club, which stages regional and nationwide college flying meets. When he received his sheepskin he took up aviation right where he had left off. He started selling.

Nowadays his folks listen for the sound of his *Cub* circling the house in Hightstown. They know that by the time they have backed the car out of the garage, he will be waiting at the Windsor airport for them.

Bill Strohmeier, modern-day nomad, isn't married. "I haven't found a girl who wants to go on a perpetual honeymoon trip," he says.

END

Gas Model

(*Continued from page* 62)

in the right manner, it is comparatively simple. Purchase a good grade of bamboo paper. Four sheets 24 x 36 inches should be plenty. Regular model airplane cement, cut with about 1/3 thinner, makes a good adhesive for applying the bamboo paper to the framework.

Cover each side of the fuselage and bottom separately. The turtle-back should be covered in separate strips, a stringer space at a time. Frayed edges may be rubbed down with a small amount of dope so as to gain a smooth edge.

In covering the wings it is necessary to attach the bamboo paper to the bottom of each rib. This is required to retain the proper airfoil section. In covering, keep as many of the wrinkles out as possible. It is not necessary that they all be removed as the shrinking of the paper by water will do this. Cover all parts of the model before assembling.

To shrink the bamboo covering use any cheap spray gun such as used for spraying disinfectants and plants. These may be purchased for about 10c. If this is not obtainable, use a brush and brush the water on carefully, as too much pressure from the brush will dig holes in the bamboo paper. Pin the wings and tail surfaces upon a flat surface and allow to dry. After drying thoroughly, three to four coats of clear dope may be added with a light sanding between each coat. Color coats may then be added.

(*Continued on page* 97)

Aviation Embassy

(*Continued from page* 22)

"Up until recently," he says, "people talked to me about flying the same way they used to talk about riding in a horseless carriage. Get in one of those things! Why, one crashed yesterday."

When he flew the Pacific in 1936, upon the inauguration of Pan American Airways route to Manila and Hong Kong and sundry friends tried to make a hero out of him, Beck began figuring out a way to make unrepentant landlubbers see the light with a minimum waste of breath.

"Look here," he said. "When you get into an elevator and go to the top of the Chrysler Building, with nothing between you and death but a couple of cables, you don't stop to think about it, do you? The cables never break. And when you get off the elevator and go to the window and look out, you don't stand there thinking about how high you are. No, you sit down at a table in the Cloud Club to eat. It's the same with flying."

He thinks that installment buying, "which certainly is economically sound," is going to be the making of the lightplane industry. "Installment buying is largely accountable for the high standards of living in America," he says. "The financing companies are going to find that their losses will be no more than those on installment-bought automobiles."

Increasingly heavy traffic on the highways will do much for the popularity of lightplane flying, Beck believes, and as for fear: "Did you ever see somebody rushing by airplane to a distant point to get to a sickbed? He wasn't aware of fear. If there is a dominating thought in a man's mind, he hasn't time to be afraid. That has its lesson: as soon as flying is sold as something comfortable and agreeable, the public isn't going to be afraid of it."

Beck takes all flying in his stride. He has several million miles behind him, which includes that first flight with Robert Collier in the first privately-owned Wright airplane. Those were the days when a man sat bravely on the bottom wing, stuck his legs out in front of him until his feet took a tenuous grip on a rung, and let that contraption of Satan pour a 40-mile wind squarely into the hole recently vacated by the lower left molar.

The other day he flew from Williamsport to Lock Haven, Pa., in a *Cub,* and from there to Detroit in a Stinson "105". It was pleasant, he said, and let it rest at that.

He has gone aloft in practically everything that has looked as though it had a reasonably good chance of remaining intact in a five-mile breeze. He has known Loenings, Curtiss, Fords and Fokkers, and Stinsons, Boeings and Douglases. He has one regrettable habit while aloft. During his flight to Manila they couldn't get a good picture of him in flight because he was always napping.

XUM

Beck's attitude toward flying is reflected in the content of his magazines. Collier's is the only magazine of general circulation with an aviation editor. W. B. Courtney has traveled the world over to obtain material for articles on flying. He was the first writer to do a major overhaul job on private flying outside the field of the trade publications. Collier's has printed some 450 articles on flying, and that does not include fiction. Perhaps it is significant that the magazine began its foray into aeronautics back in 1903 with a piece on balloons. The American Magazine, too —another in the Crowell-Collier group— frequently runs articles on flying.

Typical of Collier's ingenious approach to flying was its assignment of a staff writer, Quentin Reynolds, to do an article on "Sky Flivvers" for the December 30 issue. Reynolds never had flown a lightplane and he tackled his chore with refreshing enthusiasm. Collier's prides itself on its good reporting.

"They have survived disinterest and ridicule," Reynolds said of the lightplane manufacturers. "Henry Ford was once up against the same things. But they soon stopped laughing at him and his flivvers. Today the lightplane manufacturers are proud to have their airplanes called flivvers. They are easy to handle, they get you there safely, they are fun to fly and they are inexpensive. These are four attributes that are bound to sell any commodity used for transportation." Crowell-Collier, it might be observed in passing, is the biggest user of airmail in the United States.

If Tom Beck sits at the head of the table in the house of Crowell-Collier, it is not as the stern director of the firm's destiny. In the first place, his sense of humor is too robust to permit his seeing himself as that in anything but caricature. In the second place, he doesn't want the publishing company to be known as a one-man organization. The doors to his office are always wide open because he has a constitutional aversion to ringing for his help. He calls instead. Pictures of airplanes are on the walls, of course, and on his desk are a cylinder section and a cylinder head, both fashioned into ash trays.

It is stretching the truth a mite to say that he never has had an adventure in an airplane. He did, once. It was on that first flight in the Wright plane, which was fitted with pontoons. Robert Collier coaxed the thing aloft at Red Bank, N. J. They had rounded the Atlantic Highlands when the engine began to wheeze and they had to land

"We were towed in by a boat," he says with a touch of ignominy.

END

More Airliners

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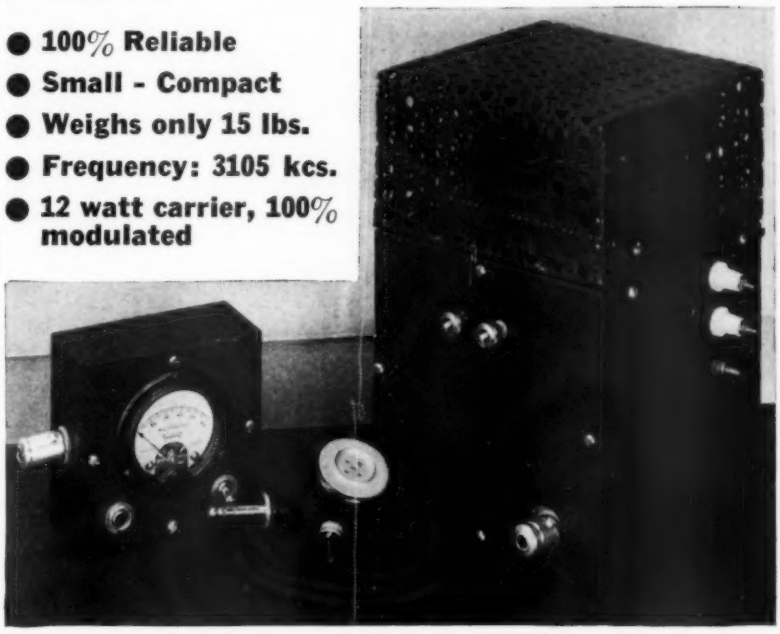

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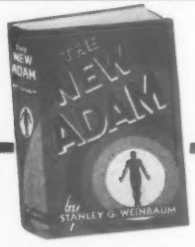

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Rocket Planes Yet?

(*Continued from page* 51)

or nitrocellulose are the most popularly used. Dry fuel, however, becomes incapable of further control once it has been ignited. In addition, it tends to create the lowest available values of jet velocity. Consequently, liquid fuels have been specified in by far the greater number of rocket experiments. These include combinations of gasoline or alcohol with such gases as hydrogen and oxygen in their liquefied states. The best available combination, from the aspect of attainable jet velocity, is that of hydrogen with oxygen. Values of jet velocity as high as 20,000 feet per second can reasonably be anticipated with this mixture. However, due to the extremely temperamental nature of hydrogen, the foremost American "rocketeer", Dr. Robert H. Goddard, working in the desert wilderness outside of Roswell, New Mexico, substituted gasoline in place of this element. With his combination of gasoline and liquefied oxygen, mixed in separate chambers and forced into the combustion chamber under the pressure of nitrogen gas, Dr. Goddard has already attained speeds approximating 700 m.p.h. with his torpedo-like rocket.

The only manner in which the actual worth of the rocket plane can be established involves comparison with existing types of aircraft equipped with conventional power plants. To cite first the advantages of the rocket or jet propulsion engine, we find upon investigation that it incorporates no moving parts to be responsible for excessive friction losses or to invite mechanical failure during flight; the absence of internal rotating members eliminates the consideration of torque loads with their attendant control and rigging problems. A far greater proportion of the heat generated by the burning fuel is expended as actual output horsepower —roughly 75 per cent as against 25 per cent for the aircraft gasoline power plant and 34 per cent for the aero diesel. Jet propulsion engines function with increasing efficiency as higher altitudes are attained, quite unlike the existing types of aircraft power plants, since the atmospheric pressure acting against the exhaust orifice in regions of lowered atmospheric density, thus permitting a less restricted flow of the escaping gases—in fact, the jet propulsion engine attains its highest possible degree of operating efficiency when functioning in a vacuum. Lastly, the area of partial vacuum generated in the wake of a fast-flying aircraft is filled, in the case of the rocket ship, by the ejected combustion gases, thus effectively minimizing the drag introduced in this manner. On the other hand, the development of the tremendous amount of power required to propel a rocket craft presents an engineering problem of major proportions; also, fire hazard becomes a vastly important consideration in view of the imminence of the dangerous products of combustion to the operating personnel.

What uses will rocket planes be likely to be put to, assuming that they will ultimately attain the stage of perfection that has already been reached by the modern airplane? The rocket type of craft may at some future time supplant the airplane as we know it today—but that day is undoubtedly far off. As metallurgists progress in their art, the development of newer metals, light in weight yet sufficiently strong to withstand the terrific pressures and temperatures encountered in jet propulsion operation, will tend to influence enormously the science of space flight. Aircraft in the comparatively near future might well utilize the power output of auxiliary rockets or jet propulsion engines in order to expediate take-offs with heavy loads. The rocket ship has already been put to work as a sort of aerial postman and has proved itself to be an ideal medium for the rapid and safe transport of important mail. Radio-controlled as well as humanly-piloted rockets would fit admirably into the picture of long-range bombing operations.

Regarding the last-mentioned factor, probably no more fitting conclusion could be inserted at this point than a quotation from an eminent ballistics expert, Major James H. Randolph of the Ordnance Reserve, United States Army:

"In the present state of the art, there probably would be no great difficulty in equalling with rockets the performance of the German long-range gun that bombarded Paris from a distance of 75 miles. But instead of firing shots of moderate capacity at long intervals, a rocket plant could fire the equivalent of 24-inch shells about as fast as desired. Such a job would be no more ahead of present practice than wartime bombing raids were ahead of the airplanes of 1913."

END

Very Quiet Birdman

(*Continued from page* 50)

Carmichael being awarded an Air Mail Pilot's Medal of Honor. Carmichael, in turn, was to quiz Arnold about the world flight. Carmichael's back was turned to the clock and he was peppered with questions about the Air Mail Medal flight. Not once in 14 minutes did Carmichael get in a mention of the world flight until 14 minutes and 30 seconds had past. "Now, Les," he said, "I know our listeners, if any, would like to hear something about the world flight."

With a twinkle in his eye, Arnold replied, "Well, Slim, I guess that'll have to wait until another time. Our time's up right now. Thanks for listening, everybody." END

Plenty of Engines

ONE engine manufacturer—Pratt & Whitney—is working on orders totaling more than $12,000,000 for the Army Air Corps alone. These engines are intended for the many millions of dollars worth of military aircraft ordered by the War Department in its gigantic expansion program. They are intended for installation on various new Army types, including four-engined Consolidated B-24 bombers, twin-engined Martin attack bombers, Republic (Seversky) pursuit ships, Curtiss observation planes and North American and Vultee trainers.

XUM

Sixth Sense

(*Continued from page* 56)

only a few pounds light, I simply grabbed the outside edge intending to bring it back to the ground with my own weight", recounts Van. "Then I would put in the additional quantity of ballast and give it a more perfect weigh-off. But to my surprise, instead of the basket coming down to the ground with my weight, it carried me on up into the air 500 feet."

A second time, when Van's "wee small voice" saved his life, perhaps, was in these same balloon pilot-training days, back in war time. Van was at this time attempting to get his balloon pilot's license and with two other students, started on a long training flight cross country.

"We started from Akron, Ohio, two days before Christmas, very early one morning, with the wind carrying us due east", Van recounts. "The flight was of special significance to me, since in my pocket was tucked away a diamond engagement ring which I intended to present to my fiancee on my return on Christmas day".

"We planned to try to reach New York, but the sub-zero temperature dampened our enthusiasm and as darkness shrouded us over the Pennsylvania hills, Joe Torrey, who was piloting, suggested that we shorten the flight to avoid the holiday traffic in New York city. Charley Roth, the aide, seconded the motion, and I, thinking of my girl and my ring, naturally approved the decision.

"We peered through the darkness for landing fields, cities or railroads, but we were flying over an absolute wilderness. The lone flashlight we carried developed the annoying habit of lighting about once in three times. It was difficult to operate at all without a flashlight, so we debated the idea of taking the flashlight apart and trying to repair it, but gave that up as a bad idea, too, as when we finished we might have no light at all.

"So we kept on flying for hours it seemed over those snow-clad Pennsylvania mountains, sometimes at 5,000 feet, sometimes 3,000, and again just skimming the tops of pine trees projecting through the snow. The wind was whistling through the trees indicating a high speed landing, if we ever should land."

"By 9 p. m. we were pretty discouraged, for it seemed as if we would never find a spot suitable to land in. Then suddenly we heard the long drawn out whistle of a train and a minute later saw the lights of a town in the valley below us.

"Here at last we can land, I thought and decided that I would be able to present the engagement ring on schedule after all. We floated down into the valley, leveled off some 200 feet above a most beautiful-looking landing field. It looked like a better field than any we had ever attempted to land on before, better than any municipal landing field back in Ohio. It was beyond all expectations, in fact.

"We were running full length of this field which was at least five miles long and at least a half a mile in width. We carefully valved a bit more gas and dropped slowly, to within three feet of the ground. Joe was just ready to pull the rip panel which would deflate the balloon instantly when my 'wee small voice' again whispered, 'Don't'.

"I told Joe immediately to release his hold on the rip-cord and to drop a heavy sand bag over first.

"The bag, weighing thirty pounds, slipped over the edge of the basket, and crashed through the thin ice of the Susquehanna River. The ice at this time was only a half-inch thick in this spot, and a landing on it, of course would have been disastrous.

"As it was, our balloon rose a few hundred feet from the effect of the sandbag I had dropped, and both Joe and Charley realized for the first time what a close call we had had. We drifted along the Susquehanna River for two miles before an air current carried us to one side of the river, where we made a very fine landing in a clearing of one of the jack mills near Williamsport, Pennsylvinia.

"The diamond ring was delivered on schedule, thanks again to my wee small voice."

END

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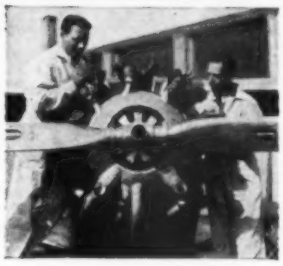

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I Learned About . . .

(*Continued from page* 55)

gan worrying about daylight. It was then five o'clock and I expected darkness at 6:30. There was the usual headwind and I opened the throttle a little wider. I had to make St. Louis by nightfall because there were no lights on the plane. We went along and my thoughts wandered back to the two landings I'd made. I thought they were pretty good even if my navigation was lousy. I thought of the ribbing I'd get at the home field and of the worry I probably was causing my parents at that moment. I did not think about my navigation, so it was a shock to see the sun sinking. My watch showed 6:02. It'd be dark in 15 minutes. And no St. Louis.

I was passing over a river, and I decided it was the Kaskaskia. I thought I was back on my map and believed the Mississippi was 25 miles further on. There still was hope. Fly 15 minutes further and hope I saw the St. Louis beacon lights. If I could see them I'd go on, lights or not. I was getting pretty desperate.

Ten minutes later I was frantic. No lights, no indication of St. Louis. I had to get down. It was getting dim down below. I glided down from my cruising altitude of 3,000 feet to get a look at the ground. It was wooded and hilly. I began to worry about the landing ahead of me, and wished for the first time I'd worn a chute.

There was a field. I dragged it and saw it was terrible. Quite a slope, trees on three sides, it was muddy. The only way to land was down hill. I put her down. The brakes saved the ship from being wrecked. We stopped eight feet from a barbed wire fence. Half a dozen people came running out of a nearby house. They saw I was in trouble and asked if they could help. Could they! I asked the important question and they said: "You're near Flat River, Missouri, about 65 miles south of St. Louis." That was the complete deflation. As a navigator I stank—confidentially.

I got a ride into town, slept in a roadside cabin. There I met a gent who said he'd once flown. He met me in the morning and helped me get a gallon of ethyl gas to make sure of enough fuel to get to St. Louis. We drove out to the pasture where I'd left the plane. A crowd was there and they watched while I started the engine and warmed the oil.

The take-off was uphill. It was the only way out. I opened the throttle wide, lifted the tail off the ground and prayed. I needed divine help to get out of that limited field after an uphill run. And once in the air I had to get between two trees. I hope I never have to do anything like that again—but we made it.

This time I followed a high tension line to St. Louis, landing at Steinberg airport, East St. Louis because my fuel was too low to allow me to make Lambert. The day was spent at Steinberg. I went over my maps, got a mild chafing from the airport manager and a lot of advice. I familiarized myself with the route, the check points and the compass courses. I was worried account I would be two days late for school and my family would be thoroughly alarmed.

Next morning there was a 200 foot ceiling and visibility was half a mile. I had the oil changed, the gas tank filled and sent a telegram home. By that time visibility was a mile on the ground and the ceiling had lifted some. I got into the air and picked out Route 66, intending to follow it all the way home.

Twenty miles south of Springfield I ran into clear air but it was so rough and hot that I bounced like a cork. I landed there to let my tummy settle. Then on to Bloomington, for more gas. From there it was straight down the railroad tracks home. What a relief when I saw Glenview again. It was swell to put her down and taxi up to the line. Also swell to turn the ship over to Dean Owsley, its owner.

I've convinced myself I would never have become lost if I'd familiarized myself with the route and the maps. Old overconfidence tripped me. I can truly say: "I learned some things about flying from this."

END

Cost of Airline

(*Continued from page* 40)

clue to the economics which have been possible through such combinations. By bringing together the operations of Varney, Pacific Air Transport, National Air Transport and Boeing Air Transport, there was knit an integrated coast-to-coast system in 1931. Elimination of duplications of services and all the attendant economies are reflected in the low-cost service now offered. Such, also, is the case with other major airlines and the same is reflected directly and indirectly in the operations among the feeder lines.

Each time technical advances have been made and tariffs lowered, the volume of airline traffic increased. This has encouraged airline officials to believe that increased efficiency, as reflected in lower operating costs in both aircraft and management, will bring aviation to the fore as a prime mover of traffic in the world. This eventually will include rates which will make present operating costs and charges appear as ridiculous as those of a decade ago.

END

New Factory

THE Aviation Manufacturing Corporation, parent company of the Stinson, Vultee and Lycoming companies, has announced plans to erect an aircraft factory adjoining the airport at Nashville, Tenn. Approximately 1,000 men are to be employed in the factory which, according to officials, will occupy 125,000 sq. ft. of floor space. No mention was made of the type of aircraft to be manufactured in the new plant.

An Airy Chat With the Editor

(*Continued from page 4*)

LIKE everyone else in the business, we've always admired those British cutaway drawings of contemporary airplanes. We have often wished we could get similar drawings of American aircraft but we never quite got around to working on it. While we deplored our lack of such drawings one of the fellows in our office, unbeknownst to us, wrote *The Aeroplane* in London requesting permission to use that magazine's drawing of the famed Messerschmitt Me-109 fighter. It was as simple as that. The gracious Englishman's approval arrived as fast as German submarines would permit. Incidentally, the accurate spelling of the name of the airplane on page 27 seems to be a minor mystery in American aviation circles. Once and for all (we hope) the name Messerschmitt does *not* contain a "d".

* * *

FRIEND was telling us the other day that Henry Ford still is interested in aviation. The man who weaned airline transportation with his famed tri-motored "Tin Goose" currently is experimenting with something that may cause him to re-enter aviation, this time in the private airplane field. We may be flying Model T's yet.

* * *

TOM BECK never hesitates speaking his mind on aviation. When you're head of one of the world's largest publishing houses you can get away with that sort of thing. Mr. Beck has a few meaty ideas in "Aviation Embassy" on page 20. One of the most important points we think he makes is that private flyers need a powerful organization to represent them in situations like that we mentioned at the beginning of this column. Only such organization the private pilot has had in the past was a tiny organization run by an east coast insurance salesman. But the newly-formed Aircraft Owners and Pilots Association may be what Mr. Beck advocates. It already has some 3,000 members.

* * *

FRANKLY, we don't think "It Takes Headlines" on page 52 is sufficient. If we had our way, we'd have a detailed handbook made up on publicity in aviation. Our handbook would include plenty of comments on "Why You Won't Get Publicity So Long as You Continue Handling it the Way You Do." That section would be especially dedicated to our well-meaning friends, the aviation industry. This industry is saturated with millions of worthwhile articles, photographs and short, interesting items. Yet the Snoqualmie Flying School is continually indignant because we don't print the notes it sent us about that lovely new fire extinguisher recently installed in the school's paint shop. Then, when we do get something worth while, many is the time it's a hopeless mess. Like the aircraft manufacturer who sends us "all the dope" on his new model—with the exception of the ship's horsepower, performance, seating capacity and cost. Maybe we'll start a publicity school.

* * *

OUR sadness-of-the-month is the fact that we had to miss flying to Miami with those 679 planes you'll find on page 18. A good half-dozen POPULAR AVIATION correspondents went along, with Kurt Rand drawing the assignment for our article. He started south from Chicago; Hans Groenhoff from New York, both out to give their all for P.A. As soon as they arrived in Florida, both of them caught such bad colds (from swimming in the ocean, the poor hard-working boys) we almost missed "679 to Miami" for this issue. A frantic series of telegrams finally convinced Mr. Rand that we just *had* to have the article for *this* issue, sniffles or no sniffles. As if that wasn't enough, we then lost track of Mr. Groenhoff. More scurrying, a cable to Cuba and then our elusive photographer turned up—in a Miami hotel bed. He was so sick he had to send his negatives out to be printed. We got 'em, two days late. . . . Why couldn't we fly to Miami too? We had a deadline.

* * *

And a cold. M. K.

END

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Air Cameramen

(*Continued from page 72*)

each other when we started sliding away.

There aren't many more dog fights. The producers aren't making any more pictures about World War I when the new one is so important. Last work of this kind I had was in "Men With Wings." When filming these the pilot who flies the camera ship has to use his head. We work over a general flight plan on the ground with the director, his assistant and all pilots concurring. Say it's a peel-off of a French squadron diving on Fokkers. We then go aloft. At about 10,000 we waggle our wings indicating we're ready. The chief pilot waggles back. He dives, with the other pilots riding tail surfaces. We go along. They dive in the Fokker formation. All the ships start milling, as if they're fighting. We in the camera ship, doing about 160, circle the general melee. I'm gunning away at whatever action looks hot at the moment. The pilot has to stay out of everybody's way—and things happen fast at that speed. Put nine wild pilots in nine ships, mix 'em up and you begin to worry about your own tail surfaces creeping up and biting you in the back of the neck.

But it's a lot of fun. You never know what'll be on tomorrow's call sheet—which makes it interesting, too. The best thing about it is that I only work about half the time. My wife and I spend a lot of time taking trips, "getting away from it all," as the stars have it. As you see, it's exciting. Just about anything can happen at any time. And does.

END

Charles A. Marshall, who for 10 years has lived a life of thrills and adventure as an aerial motion picture photographer, is the ace of his craft. Only a couple of others specialize in this hazardous type of cinematography. These men have a virtual monopoly because of the technical skill, cool nerve and extensive training necessary. Marshall, who averages three days of work a week throughout the year, gets more than his share of the pay and excitement which go with the unusual job.

He was born in Los Angeles, Calif., July 21, 1900. His father was in the hardware business. He attended Los Angeles public schools, Los Angeles Junior College and left to become a flying cadet during the World War. After studies at the School of Aeronautics, University of California, at Berkeley, and flying training at March Field he was given a commission and instructor's rating. For the next 15 years he held a commission in the Air Corps Reserve.

He entered motion pictures as a laboratory technician, became an operative cameraman, director of photography and, when in 1928 a producer announced the making of "The Flying Fleet", he sought and got the job of photographing its spectacular aerial scenes. He has turned the cameras on air scenes in more than 50 pictures since. He has been married 11 years to a wife who never worries, always knows he'll be home when the job is done.

Rolling Field

(*Continued from page 41*)

ator is powered by the 75 h.p. Mercury motor which is the unit's motive power.

The roof mounts a 2½ ton boom for lifting airplane engines and two spare tires are installed in front of the unit, braced to form a bumper with which the landcraft can push huge bombers around to facilitate repair work.

The units do not have radio sets installed since the French army will make its own installations. Space is provided in the operations cabin, however for installation of a complete two-way system with typewriter desk space for the operator and also desk space for the commander.

The only apparent armament of the big landmobile is a rack of short-barreled, high-powered rifles within easy reach of the crew. While most of the unit is of steel construction, the glass is shatterproof but not bulletproof. Since the units are expected to be stationed far enough behind front lines to be subjected to relatively little danger of direct attack, they are not designed in any sense as combat units. With their 40 m.p.h. top speed it is believed they can retire fast enough for safety, in case of a sudden enemy thrust.

When the landcraft is set up for operations its steel sides are raised and lowered exposing the shop compartments to daylight and affording additional room in which to operate. The machine shop includes compactly designed lathes, drills and similar machine tool equipment, while the tool compartment carries a wide assortment of special kits for riggers, engine repairs, and other specialist work. The operations cabin provides two bunks for its three man crew, the idea being that the third man stands watch.

Couse officials say that the new units are the new and larger development of a traveling shop which has been built by the same organization for use by the Chinese army. They shipped 35 of these smaller units to China, where they have proved themselves satisfactory in field service.

END

Radio Gliding

LATEST wrinkle in gliding technique is a radio-equipped school ship now being used by the Italians. Inasmuch as most gliding instruction must be given on single-placed ships, Italian instructors have taken to installing radio receivers in their ships so that they can give the lone student flight instruction from the ground. The receiver installed in the glider weighs 6½ lbs.; the aerial is built into the wing. The transmitter on the ground enables the instructor to talk to one or any number of instruction gliders at the same time. Thus the instructor can work with a large class simultaneously.

Silent Flyers

(*Continued from page 34*)

So far, the organization has a singular safety record. There are a great many minor crack-ups. Bad landings, gusts of wind at the wrong time, landings on poor terrain and such unscheduled events call for frequent repairs. But no one has been injured seriously. A fatality in southern California some time ago could not be charged to an association member. A non-member with a string of crack-ups behind him stalled and mushed into a turn, fell out of it from 50 feet after constant warnings by his instructor. Incidentally, all of the more serious glider accidents usually start from pilot trouble at about that altitude, according to experienced pilots.

Hawley Bowlus

The association is anxious for new members, because with an increasing membership the proposed expansion will be possible—or at least will be hastened. The last meet, which netted more than $700 showed what can be done with the right effort, according to Stephens.

"The radio broadcast over 80 stations on National Broadcasting System did the trick," Stephens told me. "The soaring port was mobbed and the revenue came mostly from spectators at 25 cents a car. We were not, and are not, out to make money. We're just gliding for sport and the pastime costs us money. But the attendance, once the word got around, was a distinct revelation."

The officers, Westphal and the rank and file did excellent work last year in putting Arvin on the A-1 basis it now enjoys. From nearby communities, the officers and association got prizes of various kinds and from cities like Taft, Tehachapi, Arvin, Bakersfield and Visalia, there were special prizes for any pilots making goal flights to points within the city limits. Cooperation also was secured from the Bakersfield post of the American Legion and the wide-awake Kern County Chamber of Commerce.

The Arvin-Sierra Soaring Port is situated on a knoll in the hills—in the east they'd be mountains—not far from Arvin. The hills drop abruptly to the Kern County flats. Use of the port was first given and has since been guaranteed by Brody Hamilton, manager of the Tejon Ranch, owning the property. It may be used by the membership at any time without charge. Sanitary conveniences and some equipment have been installed.

"Some day soon, however," Stephens says, "we're going to have a port which we own and the equipment we need. When this time comes, gliding will come into its own."

END

The Fighting Chinese

(*Continued from page 74*)

The incessant raids on civilian areas and the enormous destruction caused by Japanese bombings stirred the usually placid Chinese into a fury, with the result that Japanese pilots caught alive were usually impaled on pitchforks or destroyed in some other unique manner. It was not war strictly according to Hoyle, but the reaction that could be expected from a stunned people watching helplessly while the ashes of their dead—homes and people—darkened the fields and skies.

Mme. Chiang finally made a gesture that mirrored not only her American training, but the great heart and spirit that has endeared her to her people. She issued this order to her commanders:

"Extend every help and courtesy to enemy airmen taken behind our lines. Feed them, clothe them. Teach them our language and our ways. Show them, by every kind deed and word, how China fights a war."

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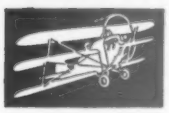

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(*Continued from page* 19)

to Louisville that ranged down to 400 feet. The group from Cincinnati and Cleveland didn't even start. All the ships from southern Illinois, Iowa and Wisconsin ran into zero-zero weather at certain points. Under these conditions it is surprising that there were nearly 100 lightplanes on the field at Louisville that night —December 28.

They kept coming in from about noon until long after dark. One little girl (it's better not to mention her name here) landed her Aeronca "K" about 7:30 p. m. —which is a few minutes after sundown even in Kentucky. She had no lights and apparently didn't see the American Airlines Douglas that was coming into the same field. The Douglas pilots didn't see her, either. The result was comic only because the two airplanes didn't tangle. The Douglas landed right over and ahead of the Aeronca. The girl pilot luckily escaped having her ship get out of control in the slip-streams from the Douglas' big engines. She was angry yet honest enough to admit that the whole thing was her own fault.

But we're getting ahead of the story. The cruise this year was so big that it was organized in four wings, the Eastern, Central, San Antonio and Dallas-Memphis wings. It was planned to have the 40 to 50 h.p. planes start from various points on December 28 and have the larger jobs in the 50 to 75 h.p. classes begin the flight a day later.

The pre-flight organization was handled entirely by the airplane companies: Aeronca, Taylorcraft, Stinson, Porterfield, Piper and Luscombe. Pilots flying each of these types of craft were sent credit cards issued through Gulf. Entries had to be in by December 20. The routes were arranged so that the longest nonstop flight was 140 miles and some of the shorter ones as short as 40 miles. For instance here are the first day's flights for all wings:

Eastern

Roosevelt Field, N. Y. to Camden, N. J.—112 miles.

Camden to Baltimore (Rutherford Field)—86 miles.

Baltimore to Washington (Alexandria, Va.)—48 miles.

Central

Lansing, Mich., to South Bend, Ind.—115 miles.

South Bend to Indianapolis (Hoosier airport)—130 miles.

Indianapolis to Louisville—110 miles.

San Antonio

San Antonio to Gonzales, Texas—65 miles.

Gonzales to Houston, Texas—125 miles.

Houston to Beaumont, Texas—75 miles.

Dallas-Memphis

Dallas to Marshall, Texas—135 miles.

Marshall to Shreveport, La.—37 miles.

Shreveport to Monroe, La.—100 miles.

Monroe to Jackson, Miss.—107 miles.

That gives you an idea of a typical day's flight. The Central Wingers got away okay as did the Eastern Wing. The Easterners, however, were stuck for two days in Washington account of weather —low ceilings and visibilities in the hundreds of yards rather than in miles. At Louisville, the snow was still coming down on December 29 when the lower horsepower ships started for Nashville.

If you know the terrain there you remember it is pretty rugged. The hills begin within a few minutes after leaving Louisville and they are about 2,000 feet high with heavy timber that offers no landing place for even a *Cub*. Heading out into that stuff, with thick grey snow-clouds spilling flakes at frequent intervals, takes considerable guts for a lightplane pilot. But the gang got off, heading for Smith's Grove, Ky., where Dick Fender, the Civil Aeronautics inspector who was shepherding the light stuff on that wing, said they'd better stop. Some of the bolder talkers decided privately they'd go all the way through to Nashville—152 miles—but none of them did. Everybody stopped because everybody picked up a load of ice just east of Smith's Grove.

Some of the funniest scenes of the trip came there. While 50 assorted lightplanes were on the ground there, a mild sleet storm swept by and left each ship coated with ice. When the boys tried to get off they found the ships wouldn't fly. Four or five of them ran the full length of the field wide open without lifting off at all. About then they remembered that ice changes the airflow over wings. In 10 minutes the entire emergency field there was covered with teams holding down wings of lightplanes while two or three men rubbed off the ice by sawing away with one of the tie-down ropes each ship carried. Then, with the ice removed, the little ships flew as normally as ever and each one got away without difficulty.

This was the final touch of bad weather for the Central Wing. That day's flight took the tour out of the snow. It disappeared just a few miles outside of Nashville and none of us saw it again until we got into Georgia on the way back. The 30th was a perfect day with unlimited ceilings and visibility of 30 miles or better. All of the Central Wing got a thrill going over the high ridges between Nashville and Chattanooga, but nobody had any real trouble. Atlanta was just a breeze—although the control tower operator who spoke in broad Cracker accents was driven slightly wacky by the putt-putts landing on all sides of the sedate airliners there.

On the way south from Atlanta to Albany, Ga., the control field for the 30th, some of the crowd took advantage of the strong tailwinds to avoid going by the dog-leg to Macon and rode directly across country. They went over the old Government training field at Americus, Ga., where so many wartime pilots were trained and whence the war surplus of airplanes was sold off, in 1919 and 1920.

Albany, we found, was a little two runway field without hangars and without any service facilities of any kind. Gulf

gas was pumped into the tanks by hand pump from a drum on a truck. But Albany hospitality was warm, even though there was a cold wind. Many of us had our first drink of the tour there, relaxing a bit after the tension of bad-weather flying on the two previous days.

The first real accident of the trip came at Albany. Joe Malecek and Larry Blummer sheared the wings off their Taylorcraft "40" after attempting a take-off out of a little pasture where they'd stopped for directions and fuel. The pasture was 20 miles east of Albany. When the fuselage stopped rolling, Joe got a farmer to help him load the fragments of the plane on a truck and came in with Blummer. Both of them got rides in other ships and went on the next day.

It was a beautiful day on the 31st. A lot of us in the Central Wing got our first look at real Florida Everglades after stopping at Lake City for a Florida map and gas. Two of the group, Rufus Rucker and DeWitt Wendell of Chicago, were flying formation at 4,000 feet when they saw Ocala, Fla., below. Wendell waggled his wings and they both slid down to land and go swimming on Dec. 31, 1939, in the famous Silver Springs six miles outside Ocala. A lot of the rest of the cruise also went out to the springs but Rucker and Wendell were the only two to go into the wonderfully crystal clear water. The pool was 72 deg., the air outside 68. Both pilots caught colds but declared they were worth the risk.

That night the entire wing landed at Orlando, Fla., on one of the most beautiful airports the country holds. Orlando has 39 lakes and one of them is right alongside the flying field. The flivver planes lined all four sides of the port and those on the lake side took the occasion to pull their ships down by the water and give them a washing.

It seems it's an old southern custom to shoot fireworks during the Christmas holidays. The northern pilots in the tour quickly got the idea, bought out all the fireworks in town and for three hours that night made a battlefield out of Orlando's main street. They were tossing cannon-crackers into automobiles, throwing them at each other and dropping bags of water out of hotel windows. Rough stuff, but lots of fun at the time. Even the women enjoyed it because nobody got hurt and everyone considered it fun.

Orlando opened its country club New Year's Eve dance to the pilots and the frolic there quickly became a shambles. The pilots tossed firecrackers and confetti indiscriminately. Also they stole as many girls from the local blades as they could. Despite all the horse-play not a single fight developed.

Next evening some 400 of us were inducted into the mystic order of the Florida Alligator Club. To qualify you must have flown 50 miles as pilot of an airplane across a Florida swamp. The party involved stripping the left shoe and stocking from all the neophytes who thereafter trod a rough road to initiation and into the alligator pit to recover said articles of footwear. We came out proudly wearing our alligator pins and planning on giving the "woiks" to next year's crop of alligators.

Most of us had a long haul on the 5th to West Palm Beach. They sent us back to Lake City, thence to the coast and on down to W. P. B. Several stops for fuel and lousy headwinds. The best story about this leg involves Clifford Albecht, 21, of Dixon, Ill., and his Aeronca "K". Albecht had seven forced landings, running out of fuel, having minor motor troubles, etc., until he finally arrived at Albany, Ga., on December 30. The next morning he barely got off the airport when the main bearing in his 40 h.p. motor burned out. He got back into the field by the skin of his teeth and began wondering what he could do. Somewhere he found another "K" that had its landing gear damaged in a landing. From that plane's engine he got the part he needed for his own and rebuilt the entire motor right there. Next time he was heard from he turned up in St. Petersburg, flat broke but with his airplane still perking. He borrowed $10 there and, when all the rest of us were ready to start for West Palm Beach, he was wrapping tin sheets around his exhaust manifold. We all got away leaving him the last ship on the field.

To everyone's surprise the first arrivals at West Palm Beach found Albecht there on the field waiting for them—and still fussing with his exhaust manifold. They discovered to their horror that he had finally taken off an hour late from St. Pete and had flown directly across the worst swamps in Florida directly to West Palm Beach. The rest of us took the safety first route and followed a round-about line that doubled the distance.

"Hell, I'm an Alligator myself," grinned Albecht.

In our ranks were a lot of novices, experts, those who thought themselves experts and others. We had pilots like Zack Mosely who draws "Smilin' Jack". Zack's been getting mention of the aircade into his Sunday strips and he and Mrs. Mosely came along in their brand new *Cub Coupe* with full Lear radio—transmitter, receiver and loop. Then we had others like Helen Wilcox of New York City who is head of the 99ers there and a veteran pilot. She came down in a *Cub Coupe* too and brought a LIFE magazine photog.

In the western group there were a lot of folks like Dr. Alfons Bacon of Chicago, who brought Mrs. Bacon and his son Chucky, aged 10, in his new Stinson "105". Then there were the Caraher brothers, Paul and Michael, in their Luscombe "65", also from Chicago; and the brothers Uhlich from Riverside, Ill., in their Davis with a 65 h.p. Velie. We had with us also Mrs. Maude Squires Rufus and her son, Herman. Mrs. Rufus is 59 years old. Herman is 27. She did all the flying, Herman spending most of the time in the air snoozing. They came through without incident, a testimonial to Mrs. Rufus' ability. Her husband is a

(*Continued on page 97*)

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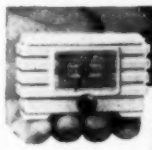

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A Pilot Walks

LIEUTENANT WALTER S. RECTOR, a member of the Army Air Corps' 6th Pursuit Squadron based at Wheeler Field, Hawaii, recently had a forced landing somewhat unusual among Army airmen. Having a little spare time on their hands, Lieutenant Rector and two fellow aviation officers proceeded to hike up a Hawaiian mountain. After a rather hard afternoon Lieutenant Rector and two fellow aviation of his buddies and reached the peak of the mountain alone. By that time, though, darkness was falling fast and it would have been extremely dangerous for the ambitious Air Corps pilot to have attempted the descent. He signaled his plight to his fellow hikers below who, after several attempts to help their stranded partner, finally returned to Wheeler Field to report Lieutenant Rector's plight. Meanwhile, the stranded pilot made the best of the situation, scraped together some brush and leaves, made a bed under a ledge, and spent what he later claims was a remarkably restful night. He walked back to Wheeler Field safely the next morning.

African School

SOUTHERN Rhodesia, Africa, has the world's first traveling flying school. Faced with difficulty of providing air instruction in several different centers, not one of which appeared large enough to support a local unit, this progressive colony decided to establish a school that should move from town to town.

Since last October the unit has trained more than a dozen pilots at Que Que and Gatooma to the stage of qualifications as "A" (amateur) pilots. Its flying equipment is a de Havilland *Tiger Moth* biplane. A flying instructor and ground engineer make up the personnel. They carry with them in the plane a tent, a box of tools and spare parts and half a dozen sets of flying helmets, earphones and goggles. Climatic conditions seriously limit the number of hours available for instruction. Usually flying is begun as early as 5:30 in the morning and is continued for three hours. An afternoon session begins at 4 p. m. and ends at 6.30 p. m. Between these two periods the exceptionally bumpy air conditions caused by the heat make instructional flying impossible.

B-17 Production

PRODUCTION of four-engined *Flying Fortress* bombers for the U. S. Army Air Corps now has been placed on an assembly line system similar to that in American automobile factories, according to officials of the Boeing Aircraft Company. What this amounts to, it is pointed out, is virtual mass production of these gigantic long range bombers. Although actual production figures now are restricted by military authorities, it is unofficially estimated that the Boeing company now will be able to produce the 22-ton bombers at a rate of one every two or three days. Practically all of the Boeing company's 175,000 sq. ft. of space in its Plant No. 2 includes this new assembly line.

(*Continued from page* 95)

professor of astronomy at the University of Michigan and she flew down from Ann Arbor.

We believe the record for distance flying to participate in the cruise is held by Miss Freda Kissame of Pasadena, Cal. In her Luscombe "65" she flew all the way from Burbank airport, across the mountains and the desert too. Freda, whose ship also had a complete radio installation, complained bitterly that control tower operators wouldn't talk to her and that she wasn't able to use the transmitter because the Federal Communications Commission hadn't yet given her ship a license as a sending station. Her round trip flight will amount to something like 5,000 miles. The rest of us averaged about 2,500 miles round trip.

END

Forced Landings

(*Continued from page* 70)

or other extremely hazardous obstructions. Don't worry too much about the airplane. It can be repaired much more painlessly than can your body.

The desire to turn back is a natural desire to return to a haven. The only way that this fixation can be overcome is by those simulated forced landings during training. Even experienced pilots should get into a ship at least once a month with another trained man and take turns pulling back the throttle on the take-off and shortly thereafter. I think, too, that even experienced pilots should frequently practice dead stick landings. Then, when and if a motor failure occurs, the mind will not be shocked by the suddenness of it.

One last word of warning. In training students in forced landings the instructor must keep on the alert as he pulls the throttle back, because the student may get the ship into trouble before the instructor can take command. Simulated forced landings are extremely serious maneuvers. Even the most experienced instructor can court trouble during such practice if not alert.

END

Gas Model

(*Continued from page* 86)

Assemble the model, making sure all parts have been lined up properly. The model, now finished and equipped with battery and fuel, is taken to an empty lot for balancing. By placing the fingers on the under side of the wing, one-third of the way back from leading edge, the body should rest in a slightly downward position of approximately 1½° to 2°. If this is not had, move batteries back and forth until the proper balance is obtained.

Next, launch the model in a slight downward position to see that it has the proper gliding angle. Having checked these steps, test the model under power, using a very small amount of fuel so that the hops will be very short. The better method is to provide your model with a timer.

This model if constructed according to the plans is an excellent flyer as a number of this type has been flown and tested with remarkable results.

END

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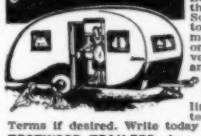
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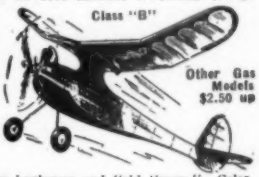

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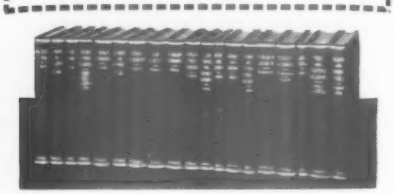

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